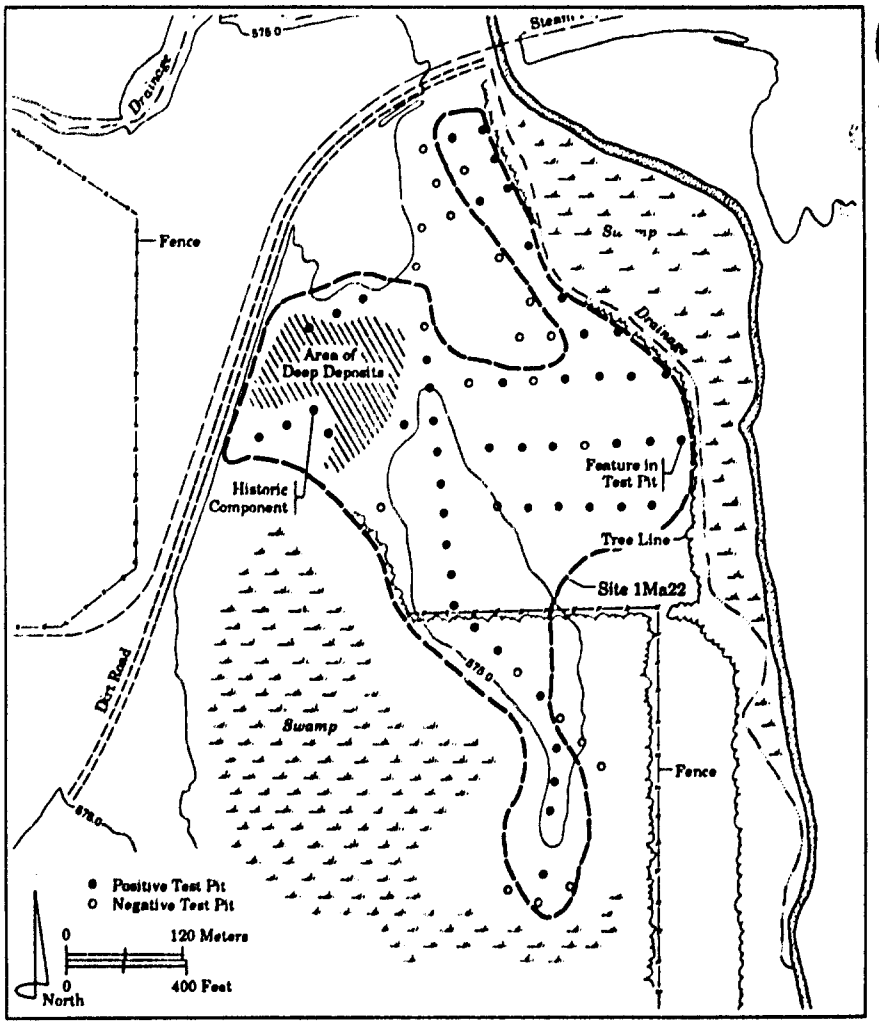
COESAM/PDER-91/002

Archeological Test Excavations at The Proposed Dry Boat Storage Facility and Archeological Survey of The Neal Road Extension Corridor

Redstone Arsenal, Huntsville, Alabama



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20.0 ABSTRACT (Continued from Form DD 1473)

adjacent to the McDonald Creek Swamp. This settlement relationship suggests an attachment between hunter-gathers and swamp environments which is perhaps a reflection of child-rearing and women's mobility. Of these 12 sites, only 2 were considered significant.

COESAM/PDER-91/002

ARCHEOLOGICAL TEST EXCAVATIONS AT THE PROPOSED DRY BOAT STORAGE FACILITY AND ARCHEOLOGICAL SURVEY OF THE NEAL ROAD EXTENSION CORRIDOR, REDSTONE ARSENAL, HUNTSVILLE, ALABAMA

Report prepared for and research funding provided by:

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ABSTRACT

Archeological investigations undertaken at Redstone Arsenal in 1990-1991 focused on two areas proposed as sites for future construction activities. These areas include the location of a four acre site proposed as a dry boat storage facility and a highway corridor for the extension of Neal Road. The Neal Road Extension Corridor was approximately 2.5 miles long and varies from 0.25 to 1.0 mile in width. The work was completed in order to comply with Federal legislation including the National Historic Preservation Act of 1966, as amended, and Executive Order 11593 (Protection and Enhancement of the Cultural Environment). New South Associates, subconsultant to ERCE, conducted the archeological survey and testing operations under Contract Number DACA01-90-D-0035. Methods for completing this work included shovel testing and limited excavations of proposed impact areas except swamps, severely disturbed lands, and lands previously surveyed.

The results of the Dry Boat Storage Facility investigation confirmed that the materials recovered from this location represent a southwestern extension of Site 1Ma126, which was previously determined to be eligible to the National Register by Oakley and Driskell (1987). Systematic shovel testing north of the proposed facility yielded cultural materials beginning at the proposed construction site to the southern edge of the previously defined boundary of Site 1Ma126. Furthermore, the recovery of diagnostic artifacts indicate the presence of similar components at both the Dry Boat Storage Facility and Site 1Ma126. Therefore, the Dry Boat Facility Site is considered to be eligible to the National Register.

Survey of the Neal Road Extension Corridor resulted in the identification and/or investigation of 12 previously unknown archeological sites and eight previously recorded archeological sites. Component representation on these 20 sites include 18 prehistoric and six historic occupations. The majority of the prehistoric sites are located adjacent to swamp margins and represent lithic scatters with unknown period or phase designations. Alternatively, the historic components all appear to represent late nineteenth or early twentieth century occupations. One historic site is a cemetery.

Research conducted as part of this investigation discovered that little information presently exists concerning the tethering of cultural systems around swamp margins. While intuitive level explanations have been offered for the location of sites near swamps, no explicit research design has been formulated for determining the types of resources that were exploited or the types of activities that were conducted on sites located within this particular environmental setting. As a result, the present investigation developed a series of research questions to aid in the future examination of swamp edge sites and their significance in understanding the prehistory of north Alabama. Based on the criteria presented in the research design, two sites were evaluated as potentially significant resources, which upon further investigation, may be found to contain information important to the area's prehistory.

ACKNOWLEDGEMENTS

The field work, research, and reporting of the Redstone Arsenal survey and testing project were aided by a number of individuals. First, we would like to thank the archeological staff of the Mobile District Corps of Engineers for their assistance. Specifically, we would like to recognize Ms. Dorothy Gibbens for her timely advice and overall management of this project. Ms. Gibbens served as the Contracting Officer's Technical Representative and her knowledge of Redstone Arsenal was extremely beneficial to the project. We appreciate her assistance, and have welcomed the opportunity to work with Ms. Gibbens in carrying out this project.

During the field work Mr. Bill Schroder, Chief Environmental Officer for Redstone Arsenal, freely shared his knowledge of the history and archeology of the project area. Even with Mr. Schroder's busy schedule, he routinely consulted with us about the progress of the field work and provided us with detailed maps, photographs, and archeological reports relevant to our research at the military installation. Needless to say, without Mr. Schroder's tireless enthusiasm for the prehistory of north Alabama, the goals of this project could not have been met with such efficiency, and we thus thank him for his contributions to this report.

Mr. Eugene Futato of the University of Alabama's Division of Archeology provided an immense assistance to the project through his careful review and editorial advise on the initial draft report. Mr. Futato's knowledge of Alabama prehistory allowed us to construct a more accurate regional overview, and we are most appreciative of his comments.

Mr. Mike Blackwell of ERCE-Knoxville is also acknowledged for his help during the field work activities. Mr. Blackwell prepared many of the site sketch maps and constructed a computer generated artifact density map of the Dry Boat Storage Facility based on shovel test data. This particular map was instrumental in identifying the artifact concentrations and the location of subsequent excavation units. We would also like to recognize the assistance of Mr. Dwight Flynn, Mr. Ernie Burress, and Mr. Monty McDonald at ERCE in monitoring and guiding this project.

In the field, Mr. Marshall Brewer and Mr. Scott Ashcraft spent many hours logging in bags of artifacts, checking their proveniences, and making preliminary counts of artifacts after each day. Their work is much appreciated. In the laboratory, the daily routine of washing, cataloging, sorting and analyzing the materials was handled by Ms. Janet Maione, Mr. David Marsh, Mr. Reagan Havens, and Ms. Tracey Fedor. Their diligence in completing these tasks is greatly appreciated. A great deal of credit for the overall look of this report should go to Ms. Julie Cantley who prepared the report illustrations. Finally the authors would like to thank the other members of the New South staff who provided guidance and assistance in the final production of this report.

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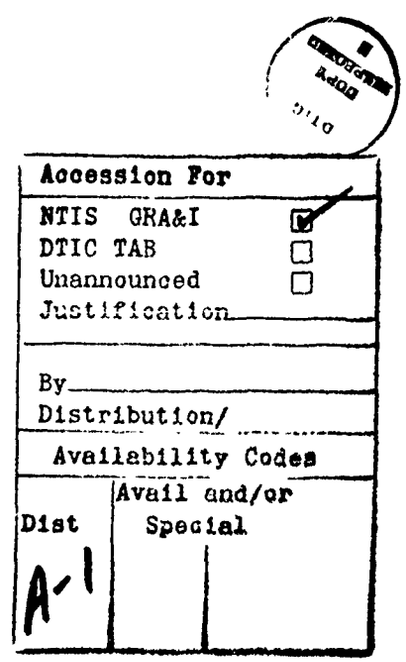

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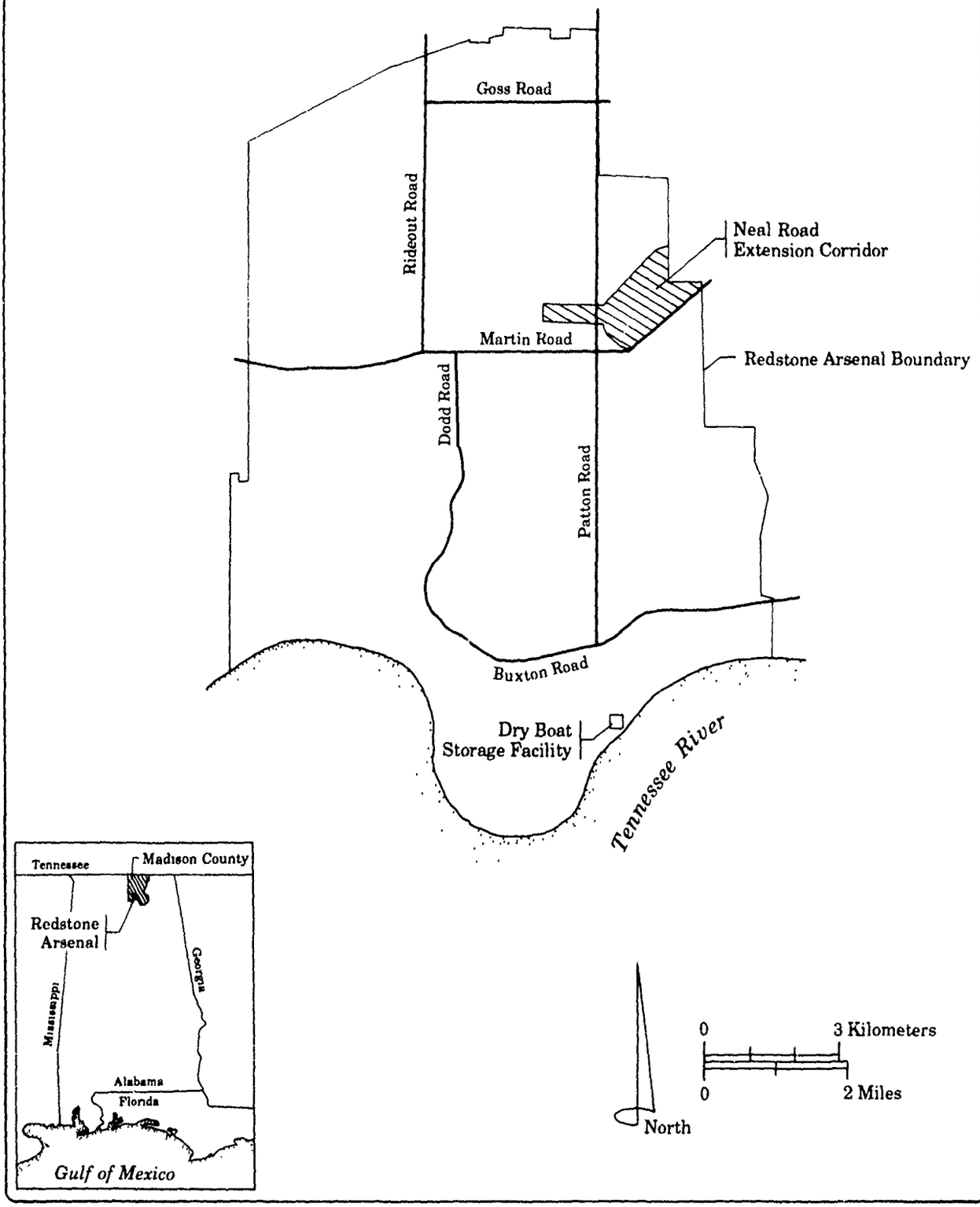
I. INTRODUCTION

This report presents the results of archeological testing at the proposed location of a Dry Boat Storage Facility and a cultural resource survey of the Neal Road Extension Corridor within Redstone Arsenal, Madison County, Alabama (Figure 1). The proposed Dry Boat Storage Facility encompasses a four acre site located adjacent to the TVA property line in the southern region of the arsenal. The Neal Road Extension Corridor, on the other hand, is located in the northern half of the arsenal and includes a strip of land measuring approximately 2.5 miles long, and varying in width from 0.25 to 1 mile. In terms of acreage, this corridor covers approximately 834 acres of military land. Archeological investigations at both the Dry Boat Storage Facility and the Neal Road Extension Corridor were completed as part of the compliance process pertaining to the National Historic Preservation Act of 1966, as amended, and Executive Order 11593 (Protection and Enhancement of the Cultural Environment). This research was conducted by New South Associates, Inc., serving as subconsultant for cultural resource investigations to ERCE to Indefinite Delivery Contract DACA01-90-D-0035, Delivery Order 4.

Field work began at the Dry Boat Storage Facility on November 14 and continued until December 12, 1990. On December 13, the investigation shifted to the Neal Road Extension Corridor beginning in the western region of the corridor and progressing in a easterly direction to the arsenal boundary. This aspect of the project was completed on December 21, 1990.

Due to the research objectives of the present project, it was necessary to implement different field techniques during the course of the field work activities. The first objective of the project involved further documentation and evaluation of a known site at the proposed Dry Boat Storage Facility. In order to accomplish this objective it was necessary to conduct more intensive testing to adequately assess site significance and document the relationship of this site to other significant sites known in the immediate area. Conversely, the second objective was the discovery of sites within the Neal Road Extension Corridor, which required less intensive but more extensive (widely spaced) test procedures covering a much larger area. A detailed description of the field and laboratory methods for each phase of the project is presented in Chapter III of this report. Regional environmental and cultural historical background is provided in Chapter II. The results of the field work activities are presented in Chapters IV. Chapter V presents the conclusions and recommendations derived from this research.

Figure 1
Redstone Arsenal Project Area



II. ENVIRONMENTAL AND CULTURAL BACKGROUND

INTRODUCTION

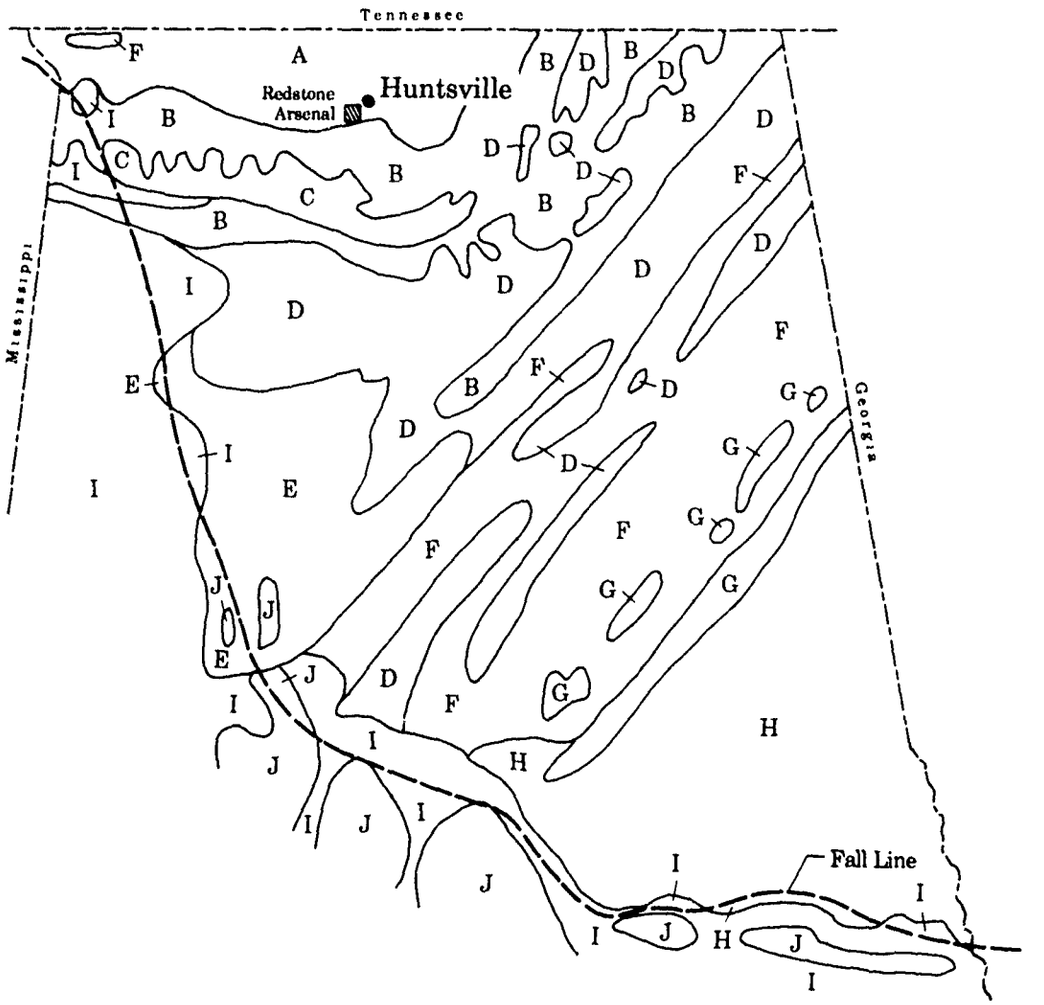
This section of the report relies on a number of previous studies by physical and social scientists working in the north Alabama region. It has generally been recognized that environmental variables play an important role in human activities, whether pertaining to prehistoric subsistence-settlement strategies or the location of historic-period industrial sites near naturally occurring resources. So critical is the relationship between environment and human societies that Federal guidelines (36 CFR 60) indicate the necessity of including environmental overviews in cultural resource studies. In addition to the environmental overview presented here, a cultural overview is important for documenting the nature, distribution, and significance of known cultural resources in the project area. This information, in conjunction with the environmental data, forms the basis for evaluating the relative importance of sites and for making final recommendations for future research.

PHYSICAL ENVIRONMENT

Redstone Arsenal encompasses approximately 38,300 acres of land located southeast of Huntsville in north central Alabama (see Figure 1). The arsenal is bounded to the north, east, and west by the city limits and to the south by the Tennessee River. Physiographically, the Arsenal is located along the eastern edge of the Highland Rim Section, which extends from southern Kentucky to northern Alabama. This landform is characterized as generally rolling to flat with few large mountains and an overall elevation of approximately 1,000 feet above sea level (amsl). Within the arsenal itself, the average elevation is approximately 625 feet amsl, with higher elevations associated with Madkin, Bradford, and Hatton Mountains and lower elevations occurring along the floodplains of the Tennessee River and Huntsville Spring Branch. To the east and south of the arsenal is the mountainous Cumberland Plateau Section that rises to an elevation of 2,000 feet above sea level. The proximity of the Arsenal to such environmental diversity would have provided a wide array of resources for human groups to exploit on a seasonal or yearly basis. Figure 2 illustrates the arsenal's environmental setting in relation to the overall physiography and phytogeography of north Alabama.

The geology of Redstone Arsenal consists of Mississippian-age sedimentary rocks including limestones, sandstones, and chert. A large percentage of the Arsenal (except in the northern-most regions of the military facility and the mountains) is underlain by the Tuscumbia Limestone Formation. In the extreme northern areas of the arsenal, Fort Payne chert is the predominant bedrock type, while the mountainous areas consist of stratified deposits of Ste. Genevieve

Figure 2
Physiography of North Alabama



Tennessee Valley
- A Chert Belt
- B Tennessee Valley proper
- C Little Mountain

Coal Region
- D Plateau
- E Basin

Coosa Valley
- F Coosa Valley

Blue Ridge and outliers
- G Blue Ridge and outliers

Piedmont
- H Piedmont

Central Pine Belt
- I Shortleaf Pine Belt
- J Longleaf Pine Hills

After Harper, 1942

Limestone, Hartselle Sandstone, and Bangor Limestone (at the top of the mountains).

The Fort Payne Chert formation was no doubt an important geologic formation in the region during prehistoric times, since aboriginal groups would have exploited this resource for the production of stone tools. Fort Payne cherts are typically bluish-gray, although this color can vary between different outcrops, and exhibit a porous and stony texture (Holstein et al. 1989:10). Experiments conducted with this material have shown it to be easily quarried and worked by experienced knappers (Adams et al. 1926:164-166). Fort Payne chert outcrops occur some 75 miles from the Arsenal; other undifferentiated cherts occurring in the local limestone deposits were no doubt exploited by aboriginal groups, as were sandstones. The latter would have been suitable for fashioning abrading tools useful for straightening and/or for grinding purposes. As illustrated in the discussion above, the naturally occurring geologic formations at Redstone Arsenal would have provided an ample supply of raw materials to the prehistoric occupants of the region.

The geology of the region is also important for its relationship with local soil formation processes. Most of the soils occurring at Redstone Arsenal are formed as the result of chemical and mechanical decomposition of the limestone deposits and are characterized as either brownish-red or brown to gray clays. These soils have been severely leached of most, if not all, of their water-soluble material and are generally very alkaline in nature. Spatially, shallow soils occur on the tops and sides of the mountains, while the deeper soils are found along the level, broad stream bottoms. Six soil associations have been identified within the arsenal and described according to their geographic locations and drainage characteristics (Harland Bartholomew and Associates 1977, 1978). These associations include:

1. Rough Stony Land Association. This association forms over sandstones and limestones along the slopes of mountains. Generally, rough stony land soils are very thin and contain rock debris.

2. Huntington-Lindside-Hamblen Association. This association forms chiefly over limestone, although in some instances sandstone and shale serve as its parent material. All of these soils are alluvial soils that occur on level, broad floodplains and terraces of stream bottoms. Drainage characteristics of this association is poor to moderate and these soils are frequently inundated by floods.

3. Hermitage-Talbott-Colbert Association. This association forms over limestone or argillaceous limestone and is found on nearly level to hilly landscapes. Generally, soils of this association are found near the toe-slopes of steep mountains. The soils are shallow and exhibit slow permeability resulting in rapid runoff of surface water.

4. Allen-Jefferson Association. This association forms chiefly over sandstone and shale, although limestone sometimes serves as its parent material. Geographically, soils of this association are found on undulating to rolling landscapes adjacent to steep mountains.

5. Holston-Tupelo-Robertsville Association. This association occurs on stream terraces which are nearly level to gently rolling in nature. Drainage characteristics of this association vary from well drained to poorly drained soils and are usually formed over limestone materials.

6. Decatur-Cumberland-Abernathy Association. This association forms over limestone bedrock and is generally well drained. Soils of this association are generally deep and found on nearly level to gently rolling terrain.

The associations described above encompass most of the soil types occurring within Redstone Arsenal. Most of the soils at the Arsenal are deep soils formed under mixed (but mostly deciduous) forests, which occur along the terraces and floodplains of streams. Archeologically, these soils have the best potential for containing buried cultural deposits. However, the process of erosion, construction projects, and the alkaline nature of the soils have all served to adversely affect the integrity of the deposits and the artifact content of sites. For instance, Dye (1985:2-3) has noted that due to the alkaline nature of the local soils, lithic and plant remains are more likely preserved on sites than ceramics and faunal remains. Likewise, agricultural practices and the day-to-day operations of the military base have had post-depositional effects on cultural resources. This is not to say that the research potential of all the cultural resources at Redstone Arsenal has been lost, but that investigations should place added emphasis on identifying and evaluating post-depositional disturbances in the future.

Locally occurring soils at Redstone Arsenal determine for the most part specific edaphic conditions, which in turn structure plant community distributions. Braun (1950), in her seminal work on the Deciduous Forest of Eastern North America, has classified the area surrounding Redstone Arsenal as belonging to the Western Mesophytic Forest Region. This region extends northward from the military base into southern Ohio and Indiana and southward to the Cumberland Plateau Province of north central Alabama. While distinct geographical boundaries separating the different forest regions do not exist, the northern-most limits of the Western Mesophytic Forest Region corresponds to the southern margin of the glacial till plains where Beech-Maple Forest predominate. To the south, the Western Mesophytic Forest Region gives way to both Mixed Mesophytic and Oak-Pine Forests of the Cumberland Plateau and Piedmont regions.

The forest composition of the Western Mesophytic Forest in the project area consists of white oaks (*Quercus alba.*) and hickories (*Carya spp.*) on most slopes with the white oaks decreasing in number at the higher elevations. Along the ridges, chestnut oak (*Quercus montana*), black oak (*Quercus velutina*),

hickories, post oak (*Quercus stellata*), and blackjack oaks (*Quercus marilandica*) comprise the majority of the forest canopy, while the ravines are dominated by beech (*Fagus grandifolia*), tuliptree (*Liriodendron tulipifera*), sugar maple (*Acer saccharum*) and white oaks. Harper (1942) has studied the Western Mesophytic Forest of northern Alabama and has subdivided the Tennessee Valley basin into three regions including the chert belt, the valley proper, and the Little Mountain district (see Figure 2). The Little Mountain district is located to the west and south of the present project area and will not be discussed. In the chert belt, oaks (*Quercus alba* and *Q. falcata*), pines (*Pinus echinata* and *P. Taeda*) and historically chestnut (*Castanea dentata*), are the dominant upland tree species in most areas, except where limestone flats occur. In those areas, red cedar (*Juniperus virginiana*) flourishes and occurs in almost pure stands, interrupted only by bare openings. In the ravines of northern Alabama, a lush and diverse forest occurs which includes such trees as beech, tuliptree, sugar maple, red oak (*Q. borealis*), shellbark hickory (*Carya ovata*), black walnut (*Juglans nigra*), basswood (*Tilia heterophylla*), white ash (*Fraxinus americana*), red elm (*Ulmus fulva*), and sweet buckeye (*Aesculus octandra*). Although little remains of the valley forests, the edaphic conditions are such that the southern red oak or Spanish oak (*Quercus rubra*) was undoubtedly the dominant species of this region. In the more poorly drained areas of the valley bottoms swamp forests are likely to form, which contain a considerable variety of swamp shrub and herb species. The overstory of these swamps usually consist of oaks (*Q. palustris, Q. bicolor, Q. Prinus, and Q. Phellos*), sweet gum, red maple, sour gum and beech tree species.

Forest destruction over the past 200 years has drastically altered the natural environment of the project vicinity. Clearly, the impact associated with this destruction has severely affected the local habitats of animals, which has resulted in the overall population reduction of certain animal species from the area. For this reason, as well as changing paleoenvironmental conditions (discussed below), it is difficult to reconstruct precise faunal species lists which were economically important to the early human inhabitants of the region. As a result, information pertaining to potential animal resources are restricted to modern day species lists, data recovered from paleontological or archeological sites, and early ethnohistorical narratives that discuss the local wildlife or the aboriginal use of specific animal species. Modern species lists are available for the vertebrate animals occurring in the Redstone Arsenal vicinity and include over 100 species of fish and 250 species of birds (Harland Bartholomew and Associates 1977). Animal species occurring in the project vicinity that are considered by Alabama biologists or federal agencies as endangered, threatened, or candidate species include the Tuscumbia darter (*Etheostama tuscumbia*), golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaectus leucocephalus*), Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*Accipiter striatus*), osprey (*Pandion haliaetus*), and Red-cockaded woodpecker (*Picoides Borealis*) (Harland Bartholomew and Associates 1977).

Forest dwelling terrestrial mammals that are believed to have played an important role in the diet of early aboriginal populations inhabiting the region

include white-tailed deer (*Odocoileus virginianus*), turkey (*Meleagris gallopavo*), black bear (*Euarctos americanus*), mountain lion (*Felis concolor*), bobcat (*Lynx rufus*), red wolf (*Canis niger*), raccoon (*Procyon lotor*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), weasel (*Mustela erminea*), gray squirrel (*Sciurus niger*), fox squirrel (*Urocyon cinereo argenteus*), eastern chipmunk (*Tamias striatus*), and the opossum (*Didelphis marsupialis*) (Shelford 1963). Indirect evidence also suggests the possibility of bison (*Bison bison*) and elk (*Cervus canadensis*) occurring in the project area. As late as the eighteenth century the presence of these two species were recorded in both the Georgia and South Carolina Piedmont regions (Logan 1859, Mills 1972). Another economically important animal species that has since become extinct is the passenger pigeon (*Ectophistes migratorius*). An early historical narrative described a passenger pigeon migration as so intense that (Lawson 1952:48 as quoted in Taylor and Smith 1978:29):

> they broke down Limbs of a great many large Trees all over these woods whereon they chanced to sit and roost, especially the great Pines... These Pigeons, about SunRise... would fly by us in such vast Flocks that they would near a Quarter of an Hour before they all passed by.

The discussion of animal resources presented above has focused principally on terrestrial animals. However, archeologists have long recognized the important role of other animals, particularly aquatic species, played in prehistoric subsistence systems (Lee 1968). For instance, at the Russell Cave Site in northeastern Alabama archeologists recovered the remains of 14 fish and 18 mollusk species in the cave deposits (Clench 1974, Weigel et al. 1974). Unfortunately, little information presently exists on the types of aquatic species that were exploited by prehistoric populations inhabiting the immediate project area.

Paleoenviromental studies indicate the dynamic nature of previous climatic, floral, and faunal regimes, which occurred throughout the southeastern United States and had dramatic impacts on indigenous prehistoric populations. In northwest Georgia, not far from the Redstone Arsenal project area, a series of pollen diagrams constructed from core samples retrieved from Pigeon Marsh, Quicksand Pond, Bob Black Pond, and Green Pond documented vegetation changes in the Ridge and Valley and northern Piedmont regions as early as 30,000 years ago (Watts 1970, 1973, 1975). These studies indicate that during the Full-Glacial Period (25,000-15,000 BP) a boreal forest with minor occurrences of spruce, fir, and hardwoods occupied the region. The Late-Glacial Period (15,000-10,000 BP) marked a transitional period in which the boreal vegetation gave way to a forest dominated by oak, hickory, and pine with minor quantities of birch, hornbeam, ash, beech, elm, and chestnut (Watts 1973). Finally, the latter Post-Glacial Period (10,000-Present) exhibited a decline in the number of hardwood species and an increase in pine.

More recent interpretations of southeastern paleoenvironments have been offered by Delcourt and Delcourt (1981, 1985, 1987). Dye (1985:2-6) has summarized

these latest results in his archeological overview of Redstone Arsenal, which outlines the chronological sequence of vegetation changes beginning 40,000 years ago. These data are reproduced below in Table 1. During the earliest period the Laurentide Ice Sheet covered the Great Lakes region, which created a number of east-west oriented temperature and vegetation gradients extending into the southeastern United States. One such gradient, occurring in what is now northern Alabama. marks the northern-most boundary of the Oak-Hickory and Southern Pine Forest. This forest type persisted throughout Alabama until approximately 28,000 years ago, when a period of warming brought about a shift in vegetation to an Oak-Hickory Forest. With the advent of the Late Wisconsin Continental Glaciation at approximately 18,000 BP, the climate turned much cooler, resulting in the reappearance of linear vegetation gradients throughout the southeastern United States. During the period of 18,000 to 16,500 BP, the present location of Anniston, Alabama, exhibited a transitional forest cover separating the Jack Pine-Spruce Forest to the north and the Oak-Hickory Forests to the south. This transitional forest represented a thin ecotone consisting of conifer and northern hardwood species which stretched from northern Mississippi to South Carolina. The geographic distribution of conifers and northern hardwoods expanded to include all of north Alabama during the following warming trend after 14,000 BP. At this time in northern Alabama the greatest forest diversity occurred in blufflands and major river valleys, where a mixed hardwood forest persisted from earlier times. The preceding period, 10,000 to 5,000 years BP, saw a dramatic change in the weather patterns, resulting in the expansion of the Mixed Hardwood Forest out of the refugial areas to include most of the eastern United States between 34 and 37 degrees north latitude. Below this vegetation zone in the the Gulf Coastal Plain and southern Piedmont regions, the dominant vegetation consisted of an Oak-Hickory and Southern Pine forest. With continued warming, southern pine species increased their range and numbers to the point were they represented the dominant forest type in the deep south by 5,000 BP. It was during this time that the Oak-Hickory and Southern Pine Forest of the previous period was replaced by the Southern Pine Forest in all areas except the northeast quadrant of Alabama. In the northeast portion of Alabama, a mixed hardwood forest community persisted. The geographical ranges of these forest types have changed very little over the past 5,000 years (Delcourt and Delcourt 1981).

Concomitant with the changes in the regional climate and vegetation, changes in the faunal taxa predictably occurred. Investigators working in Alabama have discovered the remains of extinct pleistocene vertebrates including *Megalonyx* (giant ground sloth), *Mammut* (mastodon), *Elephas* (mammoth), *Equus* (horse), and *Bison* (bison) (Falconer 1857, Hay 1923, Thurmond and Jones 1981). Radiocarbon dates obtained for similar faunal specimens occurring in other regions of the eastern United States suggest that some of these animals may have been present during the earliest human occupation of Alabama.

Table 1. Paleoenvironmental Reconstruction of the Redstone Arsenal Vicinity

Date	Temporal Period	Climate	Vegetation
200 BP	Late Holocene	Modern Climate	Mixed Hardwoods
5,000 BP	Mid Holocene	Warm Climate	Oak, Hickory, and Southern Pine
10,000 BP	Early Holocene	Cool, Moist Climate	Mixed Hardwoods
14,000 BP	Late Glacial	Cool, Minor Warming	Mixed Conifers and Northern Hardwoods
18,000 BP	Full Glacial	Much Cooler	Jack Pine and Spruce
25,000 BP	Farmdalian Substage	Mild Warming	Oak and Hickory
40,000 BP	Altonian Substage	Cool	Oak, Hickory, and Southern Pine

Source: Delcourt and Delcourt 1981. Adapted from Dye 1985 (Table 2-1).

The climate of the Redstone Arsenal today is humid, temperate, and continental, with long hot summers and short, mild to moderately cold, winters. The climate and weather are influenced by a combination of warm, moist maritime air from the Gulf of Mexico and cool, continental air from Canada and Alaska.

The temperature and precipitation are typical of the northern half of Alabama. The average annual temperature is 61.5 degrees Fahrenheit with summer temperatures reaching into the low 90 degree range and winter temperatures infrequently falling below the freezing mark. The first winter frost usually occurs in late October, while the last spring frost occurs near the beginning of April. The growing season averages 208 days. Precipitation is distributed evenly throughout the year; however, intense storms are more likely to occur during the warmer months. Most flood producing storms occur in the late winter and early spring. The wettest month is March, with an average precipitation of 5.73 inches. September and October are usually the driest months with under 3.40 inches of precipitation. The average annual rainfall for the local vicinity is 52 inches.

THE CULTURAL BACKGROUND

This section summarizes the sequence of human development for northeastern Alabama and specifically the Redstone Arsenal project area. Information regarding the prehistory of the area is sketchy, and sources from surrounding regions were consulted for supporting information concerning the chronology, the subsistence/settlement practices, and the material content of cultural assemblages of human groups who occupied the region over the past 12,000 years. The cultural periods presented herein serve to describe similar material cultures and patterns of behavior for aboriginal populations living throughout the eastern United States (Griffin 1967). Likewise, phase designations serve to further subdivide the major periods into more geographically localized and temporal units. Ideally, this is accomplished using data obtained through a program of intensive archeological investigation of a specific area or region; however in the absence of these data, information obtained from surrounding regions is often times used until additional data from the local vicinity becomes available. Sources used to compile the period and phase designations occurring at Redstone Arsenal include Cambron and Hulse (1975), Knight (1977, 1990), Walthall (1980), Futato (1980, 1982, 1983), Anderson et al. (1987), Hubbert (1989), and others.

The Paleoindian Period

The Paleoindian Period is generally associated with the first settling of North America at sometime around 12,000 BP. While a debate has arisen concerning the earliest arrival of human groups, the evidence gathered from numerous archeological sites in North America tend to support this Early Holocene date (Dincauze 1984; Haynes 1980, 1987; Meltzer 1989; Kelly and Todd 1988). In the southeastern United States, Paleoindian sites are usually identified on the basis of surface finds in eroded contexts. As a result, absolute dates useful for refining a southeastern Paleoindian chronology are sorely missed. Regardless of this fact, recent investigations focusing on stylistic variations in Paleoindian projectile point forms have established a provisional temporal sequence corresponding to Early, Middle, and Late or Transitional Paleoindian Periods (O'Steen et al. 1986, Anderson et al. 1987). The Early Paleoindian Period (12,000-10,500 BP) is marked by large, basally fluted lanceolate projectile points commonly referred to as Clovis Points. The Middle Paleoindian Period (11,000-10,500 BP) is represented by projectile point forms exhibiting fluted and nonfluted fish-tailed haft elements. These forms include the Cumberland, Redstone, Beaver Lake, and Quad point types usually found in the southern Tennessee and northern Alabama regions. Alternatively, the Late Paleoindian Period (10,500-9900 BP) is marked by Dalton points; a concave base, side-notched projectile point with grinding along its base and lateral margins (Morse 1971, Goodyear 1974).

Stone tools associated with the Early Holocene occupations include both curated and non-curated implements (Cable 1982:685). Curated tools are

generally equated to "personal gear" that is carried from site to site in anticipation of future use. Paleoindian stone tools included in this category are projectile points (discussed above), hafted drills and knives, hafted and unhafted endscrapers and lateral scrapers, burins and gravers, spokeshaves and notched forms, and multi-use tool forms (implements exhibiting combinations of different tools on a single artifact). Noncurated stone tools, tools which are expediently manufactured in response to unanticipated situations and are not carried from site to site, include a full range of flake tools exhibiting bifacial and/or unifacial edge wear (Smith 1986:14).

The composition of Paleoindian tool assemblages have been interpreted as reflecting a focal hunting economy with a primary emphasis on the exploitation of now extinct megafauna (Gardner 1974, Goodyear et al. 1979, Martin and Klein 1984). Evidence supporting this argument is inferred from the locations of recorded Early Paleoindian sites along major river valleys and uplands, which served presumably as migration routes for large game animals. This position has been countered more recently by perspectives on Paleoindian settlement and subsistence which mirror in many respects the characteristics of the later Archaic Period. Hubbert's (1989:157) research on the Quad Locale, the setting of three Paleoindian "clusters" in the Middle Tennessee Valley suggests these site/artifact clusters are indicative of a settlement pattern which:

> could have consisted of several related bands which had come to live close together during a certain season. I base this upon the amazing number and variety of tools which were collected from the sites..., which suggest base-camp occupations; and, especially, upon an intuitively perceived pattern of site locations, which seem to cluster in at least three areas.... These clusters begin to take on the appearance of a sort of linear camp arrangement.

Hubbert, Gardner (1977), and others emphasize the environmental diversity of the riverine environments preferred during the Paleoindian Period, the apparent band-level social organization of the period, and the similarity in settlement patterning reflected between Paleoindian and Early Archaic sites as evidence that both Paleoindian and Early Archaic settlement/subsistence patterns were characterized by a mixed hunting and foraging strategy focused on environmentally rich river valleys.

Archaeology of Eastern North America's survey of fluted point occurrences (1982) demonstrates an impressive clustering of Paleoindian sites in northern Alabama. The Alabama survey (Futato 1982) revealed a total of 1,654 fluted point recorded for Alabama, of which 1,374 (83%) came from the northern counties of Colbert (465), Lauderdale (431), Limestone (364), and Madison (114). Madison County contains Redstone Arsenal, thus placing the Arsenal on the edge of the most impressive concentrations of fluted points in the eastern United States. As Futato (1982) notes, this concentration is focused on the Highland Rim physiographic division. His survey (1982:32) of recorded fluted-point sites suggests that two environments were preferred during the Paleoindian Period:

valley floodplains and uplands. Valley sites occur most frequently on the second or third levee back from the river channel; upland site locations include tributary valleys and bluffs. Futato notes that rockshelter sites do not appear to have been the preferred habitat during the Paleoindian Period that they would become by the Archaic, and that Early to Middle Paleoindian sites within rockshelters are relatively rare.

In northern Alabama, a large number of Early Paleoindian sites yielding Clovis projectile points have been recorded in the Cumberland Plateau and Highland Rim physiographic provinces, particularly along the upper terraces of the Tennessee River (Walthall 1980, Anderson 1990). Middle Paleoindian sites occur less frequently than Early Paleoindian sites, but are located in more diverse environmental settings. Sites dating to this period are found along both the major river bottoms and in the uplands. Cumberland projectile points have been recovered from sites along the terraces of the Tennessee River and in two rockshelters in Marshall County (Clayton 1965, 1967). Likewise, Quad and Beaver Lake projectile points have been recovered along the bottomland terraces, but are also found in rockshelter sites in upland settings (Soday 1954; Cambron and Mitchell 1958; Cambron and Waters 1959, 1961; DeJarnette et al. 1962; Clayton 1965; Cambron and Hulse 1975). During the Late Paleoindian Period, site locations show a continuing trend toward expansion into new environments. Dalton projectile points have been recovered from all the different physiographic provinces of Alabama including the Coastal Plain, Piedmont, and Cumberland Plateau (Knight 1977, Walthall 1980). In the Cumberland Plateau region of north Alabama, upland open-air sites are added to the already existing suite of bottomland terrace and rockshelter sites.

In a study of the upper Oconee River Valley in Georgia, O'Steen et al. (1986) identified 95 Paleoindian sites, and observed that settlement distribution was much more wide-spread than initially suspected. While Early Paleoindian sites were primarily identified within the floodplain, distribution appears to have extended spatially over time, with upland and inter-riverine sites occurring by the Middle Paleoindian, and upland sites becoming the preferred locations by the Late Paleoindian Period.

The trend towards increasing environmental diversity, as indicated by the locations of Paleoindian sites throughout the southeastern United States, infers changing economic strategy throughout the Paleoindian Period. Explanations for these changes in strategies are believed to be associated with the rapidly changing Early Holocene environments and animal populations. While exploitation of megafauna during the Early Paleoindian Period has been documented, it is believed that these species became extinct near the end of this period sometime around 11,000 BP (Haynes et al 1984, Meltzer and Mead 1985). The loss of this food source meant that subsequent human populations had to alter their economies and as a result, later Middle and Late Paleoindian occupations reflect greater environmental diversity, presumably for the acquisition of new food resources.

The Archaic Period

As noted above, changes in environmental conditions brought on by the beginning of the Holocene Period inspired shifts in human economic and social systems. This subsequent period in prehistory is known as the Archaic, and extended from approximately 10,000 BP to 3,000 BP. While the Archaic as a whole shares the common theme of a reliance on hunting and gathering and band organization as the dominant subsistence and social parameters, this period is also one of substantial change, as witnessed by increased evidence for reliance on gathering plant foods and securing faunal components of the diet from a broader and broader range of sources. These trends led away from migratory settlement and social patterns toward sedentary life, and by the end of the Archaic steatite and finally clay pottery was introduced. Thus the Archaic is rather securely subdivided into Early (10,000-8,000 BP), Middle (8,000-5,000 BP), and Late (5,000-3,000 BP) stages, based on artifact assemblages and radiocarbon dates taken from a number of southeastern sites.

The Early Archaic Period in north-central and northeastern Alabama is marked by numerous corner-notched, side-notched, and bifurcate stemmed projectile point forms including St. Charles, Lost Lake, Big Sandy, Kirk, Pine Tree, Damron, Decatur, MacCorkle Stemmed, St. Albans, LeCroy, and Kanawha Stemmed types (Cambron and Hulse 1975, Justice 1987). The first large corner notched projectile point forms manufactured in the project area were the St. Charles and Lost Lake types. These types occurred as early as 10,000 BP and were used until approximately 8,000 BP (DeJarnette et al. 1962, Klippel 1971, Chapman 1977). During this same period, Big Sandy points, a side notched point type, appeared throughout the eastern United States (Kneberg 1956). Identification of Big Sandy points from such notable sites as Stanfield-Worley, Russell Cave, Eva, and Modoc Rockshelter indicates the broad geographical diffusion of this style over large areas. In Alabama, however, Big Sandy points are largely restricted to the Tennessee River Valley region (Walthall 1980:50). Overlapping in time with Big Sandy points are the Kirk projectile point forms. Excavations conducted at the Hardaway and Haw River sites in North Carolina, the St. Albans Site in West Virginia, and Ice House Bottom in Tennessee yielded important chronological evidence for stylistic variations within the Kirk projectile point assemblage (Coe 1964, Claggett and Cable 1982, Broyles 1971, Chapman 1977). Archeological data gathered at these sites indicated that the small corner notched forms preceded the larger notched forms, which in turn were followed by the stemmed and serrated forms. Originally the smaller corner notched forms were not recognized as belonging to the Kirk "family" of points, but were designated by other names such as Palmers in North and South Carolina, Charleston Corner Notched in West Virginia, and Pine Tree and Damron points in Alabama. More recently, efforts have been made to consolidate these local corner-notched variants under one typology called the Kirk Corner Notched Cluster (Justice 1987:71). Chapman (1977:166) has assigned a date range of 9,500 to 8,900 BP for the small corner notched points associated with this cluster.

Occurring at the same time or postdating the small corner-notched forms in northern Alabama are a variety of larger corner notched, stemmed, and lobed point forms. Decatur points, a medium sized corner notched point, were recovered in Early Archaic deposits dating from 9,500 to 9,000 BP at Flint Creek Rockshelter and Ice House Bottoms (Waters 1959, Chapman 1977). At the Russell Cave, Rose Island, and St. Albans Sites, lobed MacCorkle and St. Albans points (identified by the rounded basal ears) were found and dated between the years 9,000 to 8,500 BP. This date range overlaps with the earlier half of the Kirk Stemmed and Kirk Serrated types (8,900 to 8,000 BP) found at Russell Cave, Ice House Bottom, and the Hardaway Site (Coe 1964, Griffin 1974, Chapman 1977). The date ranges of bifurcate stemmed LeCroy points and stemmed Kirk points also overlap, but a series of radiocarbon dates obtained from the St. Albans and Longworth-Gick sites indicate that LeCroy points postdate (8,500 to 7,800 BP) the MacCorkle and St. Albans point types (Broyles 1971, Collins 1979). Kanawha Stemmed points dated from 8,200 to 7,800 BP represents the final Early Archaic point form found in the southern Tennessee and northern Alabama regions. Projectile points of this type have been recovered at the Rose Island Site, LeCroy Site, and Ice House Bottom Site in southern Tennessee and are thought to be ancestral to the Middle Archaic Stanly point type. Kanawha points date from 8,200 to 7,800 BP (Chapman 1976).

Close examination of Early Archaic collections reveals a number of behavioral similarities with those expressed in earlier Paleoindian collections: 1) highly stylized projectile point forms exhibiting deep lateral edge beveling or economizing resharpening strategies; 2) technological organization emphasizing curation of personal gear items; 3) the preference of high grade raw materials for the manufacture of stone tools; and 4) the continued use of earlier specialized tool forms (ie., hafted end scrapers) presumably for the purpose of processing animal foods (Cable 1991). These similarities have been interpreted by some investigators as a continuation of basic economic and social organizations from the preceding Paleoindian Period (Cleland 1976, Goodyear 1979, Cable 1982).

In Northern Alabama, the Early Archaic components have been identified as New Garden (Big Sandy) and Doran Cove (Kirk) Phase cultural assemblages. Futato (1983) also places the Dalton Phase within the Early Archaic (at 10000 to 9500 BP), and identifies a Bifurcate horizon at the terminal Early Archaic (8500-8000 BP). Settlement data compiled from sites representing both cultural phases indicates an occupation strategy involving hunting camps, limited activity work camps, and multiple activity locations primarily focused upon open-air riverine locations. Initial archeological reconstructions of Early Archaic settlement/ subsistence considered the social organization of this period as organized by egalitarian bands hunting within specific territorial boundaries, and occasionally gathering for ceremonial and cultural exchange (Griffin 1952, Caldwell 1958). In many respects this view of Early Archaic society failed to distinguish any cultural aspects of this period from the preceding Paleoindian Period. However, these interpretations have been altered in light of recent findings, which suggest that plant foods comprised a much greater component of Early Archaic subsistence than previously thought (Chapman 1977, Anderson 1988). Functional analyses of

the New Garden Phase stone tools collected from the Quad Site suggest that economic diversification took place early in the archeological record and that a greater reliance on forest and riverine habitats was initiated by the tenth millennium (Wilmsen 1968:32). Furthermore, additional evidence of economic diversification has been recovered from later bifurcate point components, which yielded both plant and animal remains, storage facilities, mortars, mullers, pitted cobbles and bone fishhooks (Walthall 1980).

Information on the following Middle Archaic Period is less well documented for the Southeastern United States. Unfortunately, this cultural period corresponds with the mid-Holocene warming trend known as the Hypsithermal, which caused major shifts in prehistoric adaptations throughout the midwest and northeast (Wood and McMillan 1976, Butzer 1978). While similar cultural adjustments to environmental change are not as evident in the southeast as in the north, there can be little doubt that southeastern populations were affected by displaced populations, reorganized boundaries and trading networks, and other new social and technological developments.

Technologically, the Middle Archaic Period in northern Alabama is marked by the presence of basally notched and stemmed projectile points. Basally notched Eva points have been recovered in the Tennessee Valley at the Stanfield-Worley, Flint Creek, and Little Bear Creek rockshelters in archeological deposits dated from 8,000 to 6,000 BP (Webb and DeJarnette 1948a, b; Cambron and Waters 1959; DeJarnette et al. 1962). Stemmed points believed to occur in the region include both Stanly and Morrow Mountain types. Stanly points, although not a frequently reported point type in Alabama, have been recovered over much of the eastern United States and have a suggested date range of 7,800 to 7,500 BP based on excavations conducted at the Ice House Bottom Site in southeastern Tennessee (Chapman 1985). Postdating the Stanly points are the Morrow Mountain stemmed points. This point type has a wide distribution across Alabama extending from the Coastal Plain to the Cumberland Plateau. Probably the most revealing information concerning Morrow Mountain adaptations came from burials in rockshelter sites in northern Alabama. The burials were interred in flexed positions and included both infants and adults. Excessive tooth wear was noted on several of the adult specimens suggesting the use of processed plant foods as a main staple. Also, a number of burials contained grave offerings including projectile points, bifaces, scrapers, bone awls, antler flakers, and turtle shell (cf. Walthall 1980). The diversity of tools and tool forms have provided important information on both the typological and technological organization of Middle Archaic societies living in north Alabama between 7,500 and 6,000 BP.

Along the Atlantic Slope, Middle Archaic settlement is considered to reflect a restriction of the linear extension of proposed Early Archaic band territories along drainages, and an expansion to include and exploit a greater variety of resources (Anderson 1988). Increased sedentism, intensified reliance on local resources, and more complex socio-political organization during the Middle Archaic have been argued by a number of schclars (Stoltman 1978, Brose 1979, Brown and Vierra 1983, Sassaman 1983, Smith 1986, Blanton and Sassaman 1989). While the presence of Middle Archaic shell middens and burials with

grave offerings supports the notion of a diffuse economy and more complex socio-political organization, little information presently exists on the settlement system of groups living in the southern Tennessee/northern Alabama region. It is not known, for instance, if Middle Archaic groups migrated on a regular basis in order to reach and utilize resources or established semi-permanent base camps from which logistical groups traveled to procure necessary materials and foods. As Futato (1983:416) notes, differing views have been presented regarding whether the Middle Archaic subsistence pattern was becoming more focal or diffuse. Futato characterizes these settlement/subsistence shifts in response to the Altithermal as "chicken-and-egg" variety questions. As he noted, was the greater reliance on shellfish exhibited during the Middle Archaic a response to population increase, or a facilitator of population increase? As Futato indicates, more extensive research is necessary before questions of Middle Archaic settlement and subsistence can be addressed.

The Late Archaic Period witnessed a continued development of the social and economic processes that had their roots in Middle Archaic times. The subsistence strategy of the Late Archaic appears to be more logistically oriented, with base camps established near aquatic resources in the river valleys and specialized activity sites in the surrounding uplands (Waselkov 1980, Johnson 1981). In the Yellow Creek drainage of Mississippi, Late Archaic settlements are described in terms of five site types: base camps on floodplains, base camps on terraces; and small temporary camps located on either floodplains, terraces, or uplands (O'Hear 1978). During this period, it is becoming increasingly apparent that subsistence activities conducted at base camps included not only hunting and gathering, but also horticultural pursuits. The presence of bottle gourd, squash, sunflower, and weedy seeds in Late Archaic deposits throughout midwestern states as well as Florida attest to the widespread use of horticultural activities during this period (Chomko and Crawford 1978, Kay et al. 1980, Chapman and Shea 1981, Conrad et al. 1984, Asch and Asch 1985, Cowan 1985, Doran et al. 1990). Hunting and gathering of wild foods, however, remained the principal means of feeding the populations and as such triggered the seasonal movements of individual groups. Investigations focusing on the dietary remains of Late Archaic sites in northern Alabama have discovered evidence for the intensive use of such diverse foods as hickory, walnut, acorn, shellfish, deer, raccoon, beaver, turkey, opossum, gray fox, and rabbit (Curren 1974).

In the Bear Creek watershed, Futato (1983:416-417) recognizes three late Archaic horizons: Benton (5,600-5,000 BP), Ledbetter (5,000-4,000 BP), and Little Bear Creek (4,000-3,000 BP). Late Archaic Lauderdale Phase sites in northern Alabama have yielded a wealth of information concerning subsistence-settlement strategies undertaken during this critical period of prehistory. Large shell mound sites were created by populations which exploited the aquatic resources of the major river systems during the spring and fall seasons. However, during the winter and early spring months, when aquatic resources became more scarce or inaccessible, these same populations dispersed into the upland hinterlands to hunt and gather wild foods (Jenkins 1974, Dickson 1980). Evidence for such a settlement pattern has been obtained from archeological investigations of upland

sites, which contain numerous storage pits and wild food remains (Oakley and Futato 1975).

In the Redstone Arsenal area, Late Archaic components are marked by the presence of stemmed projectile points, particularly the Ledbetter/Pickwick, and Wade/Cotaco Creek types. Other more localized stemmed point variants recognized in the region, but subsumed under the broader point categories stated above, are Elora, Kays, Little Bear Creek, and McIntire points. The Ledbetter and Pickwick points exhibit technological similarities, except for observed differences in edge sharpening and blade rejuvenation techniques. Ledbetter points usually have asymmetrical blades with unequal shoulder barbs, while Pickwick points have symmetrical blades with equally expanding barbs (Justice 1987). At the present time, it is not known if these rejuvenation strategies are culturally or functionally significant, given that both of these point types are believed to co-occur sometime between 4,500 to 3,000 BP. The geographic range of these two points are very similar and they frequently occur in the same archeological context (Lewis and Lewis 1961, Peterson 1973, Ingmanson and Griffin 1974), which suggests that the observed morphological differences may be best explained in functional and not cultural terms.

The most recent Late Archaic point forms occurring in the project area are the Wade/Cotaco Creek types, which overlap into the following Gulf Formational and Early Woodland Periods. Both Wade and Cotaco Creek points were recovered from the Late Archaic/Early Woodland stratum at the Stanfield-Worley rockshelter and have been assigned a date range of 3,000 to 2,500 BP (Justice 1987). Wade points can be distinguished from Cotaco Creek points by the presence of long, pointy barbs that extend almost the length of the stem. Cotaco Creek points, on the other hand, are slightly larger than Wade points and have weakly developed barbs that are usually rounded (Cambron and Hulse 1975).

In addition to the various projectile point forms discussed above, another important marker of the Late Archaic Period is the presence of steatite objects. Steatite or soapstone was used to create perforated slabs (ie. boiling stones), atl-atl weights, pipes, gorgets, pendents, and other objects during this period. It was originally proposed that steatite vessels were manufactured during the Late Archaic Period; however, Elliot's (1980, 1986) research on the use of steatite and particularly the steatite bowl industry in Georgia suggests that this technological development did not occur until approximately 3,500 BP or sometime after the introduction of clay vessels during the following Gulf Formational Period. Evidence from Alabama is less direct regarding the possible association of steatite and ceramic vessels on Late Archaic sites.

The introduction of clay pottery vessels signals the beginning of the Gulf Formational Period. This period was originally defined by Walthall and Jenkins (1976) for the purpose of identifying Late Archaic components containing pottery. The date range assigned for this period is 4,500 to 2,100 BP (Walthall 1980). Ceramics diagnostic to the Gulf Formational Period include the fiber tempered Stallings Island variety, a type defined along the Savannah River; the fiber tempered Orange and St. Johns types from the Gulf Coast; fiber tempered

Wheeler and sand tempered Alexander ceramics from the Tennessee River Valley; the sand and fiber tempered Norwood types from the Gulf Coast; and sand-tempered Thoms Creek ceramics from the Georgia and South Carolina coast. The Stallings Island and Thoms Creek varieties appear to most often occur as hemispherical bowls, while Orange, Norwood, and Wheeler wares occur most frequently as flat based beakers (Walthall 1980:87, Anderson 1988:156). While plain ceramics dominate these earlier styles, decoration, including punctuation, incision, finger-pinching, and simple stamping, is known to occur. Other diagnostic materials of the Gulf Formational Period include projectile points and steatite bowls (discussed above), "netsinkers," full and three quarter grooved axes, cruciform drills, baked clay objects, atl-atl weights, and grinding basins.

Along the Middle Chattahoochee River drainage in eastern Alabama, both Norwood sand and fiber tempered ceramics have been reported within the West Point Lake region (Cantley and Joseph 1991). The presence of these ceramic types, originally defined for the Gulf Coast region, suggests cultural interactions between populations living in the Middle Chattahoochee Valley and those living much further to the south sometime after 3,200 BP. However, the appearance of earlier Stallings Island wares in the Oliver Basin (located near Columbus, Georgia) brings into question the origin and antiquity of such interactions. The Oliver Basin data suggest that very early in the Gulf Formational Period social relations and migrations may have cross-cut drainages (cf. Anderson 1988) accounting for the presence of Stallings ceramics and absence of Orange wares. Furthermore, these data suggest the region was more closely affiliated with the Savannah River district and South Atlantic Coasts than the Gulf until approximately 3,200 BP when the Norwood ceramics begin to appear in the Middle Chattahoochee Valley.

South and east of Redstone Arsenal, Gulf Formational Period ceramics have not been found in the Tallapoosa River drainage of eastern Alabama. Excavations conducted at Site 1Ra12 in Randolph County, however, yielded stemmed projectile points, steatite vessel sherds, hammerstones, mullers, and nutting stones from its earliest component (Knight 1977). Although no ceramics were found in this cultural assemblage, the presence of steatite vessels (assuming Elliott's hypothesis on steatite vessel technology is correct) and a radiocarbon date of 2,600 BP, places this occupation well with the Gulf Formational Period of the region. Conversely, a number of ceramic bearing Gulf Formational Period sites have been located along the Coosa River drainage. One site located in Talladega County yielded early fiber tempered sherds, while the remainder of the sites contained Late Gulf Formational Alexander ceramics (Knight n.d.). Alexander ceramics have been reported from Sites 1Sc37 and 1Sc38 in St. Clair County, Site 1Ca366 in Calhoun County, Site 1Sh42 in Shelby County, and Site 1Cb87 in Cleburne County (Graham 1966; Holstein and Little 1982, 1985; Wallings and Schrader 1983).

In Northern Alabama, Gulf Formational Period sites include Bluff Creek and Hardin Phase components dating between 3,200 to 2,100 BP (Walthall 1980). Bluff Creek sites contain plain, simple, punctate, and simple stamped pottery as

well as a full complement of Lauderdale type artifacts. Major Bluff Creek sites have been identified in the Pickwick Basin while only minor occupations are found in the Wheeler Basin (Webb 1939, Webb and DeJarnette 1942, 1948a, 1948b). Both the settlement data and the material assemblages obtained from the investigation of Bluff Creek sites indicate the overall persistence of the Archaic lifestyle during this period. Similarly, the preceding Hardin Phase components exhibit both behavioral and technological continuity with the Archaic Period. Hardin Phase sites in the Middle Tennessee Valley are distinguished from the earlier Bluff Creek sites by the presence of Alexander sand tempered style ceramics and Flint Creek projectile points.

The Woodland Period

The Woodland Period in northern Alabama spans the time interval from 2,300 to 900 BP and is divided into Early Middle Woodland (2,300-1,900 BP), Late Middle Woodland (1,900-1,500 BP), and Late Woodland (1,500-1,000 BP) Periods (Walthall 1980). Early Woodland Period components do not, strictly speaking, occur within the Redstone Arsenal project area due to the inclusion of sites containing Alexander ceramics into the preceding Gulf Formational Period and sites containing Colbert Phase limestone tempered ceramics into the Early Middle Woodland Period (Walthall and Jenkins 1976, Futato 1980, Walthall 1980).

Regardless of its period designation, Colbert Phase subsistence-settlement systems do not appear to change drastically from the Archaic Period. Futato (1980:123) reports that the Colbert culture was introduced from East Tennessee via diffusion along the Tennessee River, reaching the area of northern Alabama by circa 2,300 BP. He reports that the Colbert occupation of the region was extensive. This shift in settlement density from the rather sparse population suggested for the region during the Gulf Formational/Late Archaic Phase does not appear to be the product of a shift in subsistence economies, and to date no evidence has been gathered to suggest the introduction of horticulture to the region during the Early Middle Woodland. Rather, the settlement density experience during the Colbert Phase appears to reflect immigration to a previously underutilized region, which in turn produced a semi-sedentary lifeway which may have provided the impetus for the origins of agriculture in the region (Caldwell 1958, Wauchope 1966, Blanton et al. 1986). It is most probable that the earliest Woodland inhabitants of the region retained a hunting and gathering economy but experimented with various horticultural plant species, and augmented their subsistence strategy placing greater reliance on fishing (Ford 1985).

Evidence for a semi-sedentary adaptation during the Colbert Phase has been presented by Nielsen (1972), who noted the presence of limestone tempered sherds on both the Tennessee River floodplain and along smaller tributaries at substantial distances away from the main river. Nielsen hypothesizes that these latter terrace sites reflect fall or winter settlements where a different set of resources (as opposed to floodplain resources) were procured. Additional data supporting the continuation of a hunting and gathering type of adaptation is provided from excavations of rockshelters in north Alabama. Clayton (1965)

reported Colbert Phase ceramics in addition to mortars, milling stones, and projectile points presumably used for the procurement and processing of wild game and plants taken from the surrounding area. Futato (1980:123) notes that the Colbert Phase is best recognized by the occurrence of extensive open-air settlements both along rivers and back for the channel within river valleys. These sites have yielded large numbers of storage pits, hearths, ovens, and structures, which Walthall (1980) suggests is indicative of permanent or semi-permanent residency.

The Late Middle Woodland Period is sometimes referred to as the Copena culture in the Middle Tennessee Valley. The cultural designation of Copena is subject to debate. Copena is referenced by Futato (1980) as a "culture," although Cole (1981) presents Copena as a mortuary complex shared by a number of Middle Woodland cultures, a position which Futato (personal communication 1991) also now apparently shares. Based on his work at the Walling site, a truncated Middle Woodland mound complex adjacent to Redstone Arsenal, Knight (1990) has designated the Middle Woodland occupation of the region as the Walling Phase, and his designation will be followed here. Walling Phase components are marked by a high proportion of limestone tempered plain pottery, followed infrequency by the paddle stamped Flint River Cord Marked and Bluff Creek Simple Stamped wares, check stamped wares, complicated stamping, rocker stamped wares, and incised pottery (Knight 1990:157). In addition to these more utilitarian artifacts, a wide array of high status artifacts have been recovered in the numerous sand and clay burial mounds located throughout the Middle Tennessee Valley. Artifacts such as copper sheets, reel-shaped gorgets, earspools, beads, bracelets, celts, breastplates, marine and aquatic shell artifacts, ground galena discs, spheres, or beads, wooden bowls and trays, steatite pipes, greenstone celts, and finely made projectile points indicate the increased cultural complexity of the Middle Woodland cultures of the region and their close relationship with contemporary Hopewell groups living in the Midwestern United States.

Hunting and gathering still played an important role in the daily economy of Walling Phase groups, although the presence of large village and mound sites along major rivers and streams suggest an increasing reliance on domesticated products. In the Guntersville Basin, sites located along the main valley contained subterranean storage facilities and evidence of timber structures presumably reflecting occupations of longer duration. This would not be an unexpected consequence if Walthall's (1980:128) hypothesis concerning the increased reliance on cultigens (particularly maize) occurred during this time. However, the use of maize during the Middle Woodland Period is not well documented in the Southeastern United States; instead, it is becoming increasingly apparent that Middle Woodland populations adopted a gardening system comprised of starchy-oily seeds and squash. Evidence of this gardening system has been recovered from a Middle Woodland storage feature located south and east of the present project area. At Site 9Tp62, in the West Point Lake Reservoir, a storage facility yielded a diverse macroplant assemblage including four species of cultigens and four wild nut species (Cantley and Joseph 1991). Scarry's (1990:126-128) analysis of horticultural subsistence at the Walling site suggests that:

> Walling people were horticulturalists who cultivated cucurbits, sunflower, chenopod, maygrass, little barley and perhaps other plants as well. Maize may have been produced, but was only a minor element in a diverse cropping strategy. The Walling phase people may also have practiced selective weeding, tolerating or encouraging volunteer plants that yielded edible resources, such as greens and fruits.

The image of Walling Phase subsistence presented by Scarry, as supported by other Middle Woodland studies, suggests a horticultural strategy supported by the gathering of nuts, hunting, and fishing.

Late Woodland Period sites in northeastern Alabama are represented by the Flint River and McKelvey Phases. McKelvey Phase sites occur west of Green Mountain and are marked by the presence of sherd tempered cord marked, check stamped, and plain ceramics that replaced the earlier limestone tempered wares occurring in this area. East of Green Mountain, limestone tempered plain and brushed pottery continued to dominate the ceramic assemblages of the Flint River Phase groups. During this period in prehistory, it appears that the elaborate ceremonial and burial customs developed during the earlier Walling Phase declined and burials were no longer interred in mounds.

Subsistence-settlement patterns for both the Flint River and McKelvey Phase groups suggest little change from the preceding cultural period with small horticultural based settlements located along the river and tributaries and hunting-gathering sites in upland rock shelters. Corn does appear in Flint River Phase sites, in small but persistent quantities (Futato 1977). At both the Hobbs Island and McKelvey sites, evidence was gathered suggesting substantial long-term occupations with numerous postmolds, middens, and structures present. The exploitation of shellfish, a resource base neglected by earlier Copena groups, once again became an important component of the diet.

The Mississippian Period

The Mississippian culture emerged around 700 A.D. in the central Mississippi River drainage where three separate regional centers developed. One center was located in the Mississippi Valley with Cahokia as its center, the second in the Tennessee-Cumberland drainage area and the third in the Caddoan area of eastern Oklahoma, Texas, and Louisiana. The period is characterized by distinctive pottery types, many of them shell tempered, and small, triangular-shaped projectile points. Floodplain horticulture was based on maize, beans, squash, pumpkin, sunflower, and gourds. The most striking elements of the Mississippian are, however, the presence of large temple mounds on or around a central plaza with densely packed residential structures and a stockaded perimeter or moat (Alexander 1979:17, Dickson 1980:36, Walthall 1980:185-187).

The Mississippian mounds served as cultural, social and political centers. The mounds are truncated pyramids with wattle and daub structures on the mound summits and ramps or stairways leading up the sides. They required an incredible amount of human labor for construction, as the soil had to be carried by the individual basketfull and a large mound on an average Mississippian site contains 4 million cubic feet (Walthall 1980:187). The mounds were the center of the community with high status persons living in structures on the mounds and persons of lesser status occupying less ornate structures radiating out from the mound plaza. Other public buildings such as mortuaries, sweathouses, and rotundas were sometimes located in the plaza (Dickson 1980:37).

Social stratification in Mississippian villages is reflected in the layout of structures and within burial practices. High status burials, defined by grave goods, are found in the mounds and lower status burials, with no grave goods, are outside the mounds. Likewise, larger, more ornate structures are found on and near the mounds, presumably occupied by high status individuals. The farther from the mound, the smaller and less ornate become the structures and the status of the occupants becomes correspondingly lower. Stratification within the Mississippian complex did not stop at the level of the village. There were several major settlements such as Cahokia, Moundville, Spiro and Etowah which exhibited a range of social positions including chiefs, nobles, priests, and craftsmen. These larger centers and their chiefs kept smaller villages and their lesser chiefs accountable to them. This chiefdom society allowed for craft specialization such as pottery, and made the chief responsible for redistribution of goods (Walthall 1980:192).

A constant threat of warfare is evidenced by the appearance of stockaded villages seen for the first time in the Mississippian complex. Village defenses included stockades with bastions, dry moats and earthen embankments. Regions containing lands useful for agriculture as well as environmental zones containing raw materials for craft specialization were rare. Therefore, competition for these regions may have been an impetus for war. The fate of the inhabitants of a conquered town was variable. Decorated skulls have been recovered from mounds and may represent the fate of some of the conquered. Others were probably driven away, or if women and children, were adopted into the victorious tribe (Walthall 1980).

Mississippian subsistence patterns were based on a strategy of seasonal availability of native foods and cultivated foods. Three major procurement systems were used; the collection of wild plant foods such as nuts, fruits and seeds, the cultivation of crops such as maize, beans, squash, sunflower, and pumpkin, and hunting (Walthall 1980:190-191). Faunal remains indicate that the most commonly taken animals were white-tailed deer, raccoon, wild turkey, and opossum. These animals were hunted from about October to April, when cultivated foods were unavailable (Dickson 1980:40).

Crafts were numerous and utilized five primary raw materials: stone, plant products (wood, cane, and fibers), shell, bone, and clay. Copper was cold

hammered to form ornamental or ceremonial objects. Clay was made into pottery. Stone was knapped into a variety of tools such as projectile points, knives, scrapers, drills, and ceremonial objects. It was also used for celts, axes, adzes, manos, and mortars. Awls, needles, fishhooks, hoes and chisels were made from bone and antler. Shell was worked into gorgets, trumpets, beads, pins, dippers, and bowls. Wood was a building material as well as being used for canoes, drums, bows and arrow shafts. Cloth was made from weaving plant fibers (Walthall 1980:189).

Of all the crafts practiced in the Mississippian Period, the most outstanding is probably ceramic manufacture. Clay was tempered with shell, grog or sand and was decorated with incising, and punctation as well as bichrome, polychrome and negative painting. Copper, stone, and shell incorporated into the surface treatment were other forms of decoration. Besides utilitarian wares, human and animal effigy pots, strap handle pots, tripod pots and stirrup-spout vessels were manufactured (Dickson 1980:42, Walthall 1980:190).

The late Mississippian was characterized by the emergence of the Southern Cult or the Southeastern Ceremonial Complex which lasted from approximately A.D. 1200 until A.D. 1500. The artifacts that identify the Southern Cult shared artistic motifs and were found in a wide area of the Southeast that had its center in the Mississippi drainage. The motifs include the forked or weeping eye, an open eye, a bi-lobed arrow, a cross with a sunburst circle, the swastika, the skull, the heart, and the long bones as well as natural and anthropomorphized animals like eagles, serpents, rattlesnakes, cats, and birds. The Cult motifs were usually associated, by engraving, carving or otherwise, with a group of specialized ceremonial artifacts. These included shell gorgets, polished black pottery, conch shell masks, stone palettes and statues, and stone and ceramic effigy pipes (Dickson 1980:41-42, Walthall 1980:194). Many of the motifs integral to the Southern Cult seem to bear a heavy Mesoamerican influence and it has been suggested that there was contact between the two regions. However, no objects that are definitely of Mexican origin have been found in Mississippian sites and none of Mississippian origin in Mesoamerican sites. One theory suggests that a group of Mesoamerican traveling merchants like the Aztec pochteca could have made contact and been responsible for the Cult (Dickson 1980:41, Walthall 1980:194).

Definite Mississippian occupation can be divided into two phases: Early, which begins at A.D. 900, and Mature, which begins in A.D. 1200 and ends in the Protohistoric at approximately A.D. 1500. In the Tennessee Valley, in which the project area lies, the Early Mississippian is characterized by the Langston Phase and the Mature by the Henry, Hobbs, and Kogers Island Phases (Walthall 1980:195). Langston Phase occupations are recognized in the region by their appearance at the Walling Site, adjacent to Redstone Arsenal.

Langston Phase villages were usually fortified and contained substructure mounds. During this phase, elaborate mortuary rituals were introduced. Plain, shell tempered bowls, globular pots (sometimes with loop or strap handles), and fabric impressed salt pans are the diagnostic ceramic types from these sites.

Other ceramic types are also found, possibly representing trade goods. These include red-filmed, red-on-buff, and complicated stamped vessels (Walthall 1980: 200-201).

The Henry, Hobbs, and Kogers Island Phases of the Mature Mississippian represented three autonomous chiefdoms. The study area lies in the Wheeler Basin, whose sites can be attributed to the Hobbs Island Phase. Hobbs Island people built both temple and mortuary mounds. The mortuary mounds were conical, rather than truncated pyramids like those found in other Mississippian sites. Grave goods in these mounds often included ceramic vessels, shell gorgets, and beads (Walthall 1980:227).

The Protohistoric Period

The Tennessee River Valley region contained only a few settlements when Hernando DeSoto first explored the area in 1540. The sparseness of the population did not reflect an inhospitable environment but rather indicated boundaries and animosities between the three native groups occupying the area. The northern and eastern areas at the head of the Tennessee River were occupied by the Cherokee, the Chickasaw lived downstream and the Upper Creek bordered the other two groups to the south (Altschul 1980a:46). The central area of the Middle Tennessee Valley was considered by each group as belonging to them and therefore was often the catalyst for violent dispute. As a result of the disputes, the area was largely uninhabited, except for small transitory groups (Dye 1985:14).

Most descriptions of protohistoric groups come from accounts of early explorers such as DeSoto and DeLuna. Other information can only be inferred by tracing movements of one group relative to those of a better known neighbor. DeSoto mentions that in the summer of 1540 there were Indians living near the headwaters of the of the Tennessee River belonging to the "Province of Chalaque of Xalaque." He also notes groups associated with the "Province of Chiacha" on an island farther downstream near the present Tennessee-Alabama border. Despite this information, DeSoto does not mention visiting towns in either province. Other Spanish explorers in 1567 do mention two major settlements on the Tennessee River. One was a stockaded town called Tanasqui which was probably a Cherokee town in DeSoto's province of Chalaque, and the other was a large village on Burns Island which may have been the base of the Chiacha, a small tribe associated with the Creek Confederacy (Altschul 1980a:47-48).

The Koasati on Pine Island were the first group that DeSoto specifically mentioned visiting. He took the chief hostage until given information about the supposedly rich "Chisca" that lived to the north. Two soldiers were sent to explore the area and from those descriptions the natives have been identified as the Yuchi. DeSoto left Pine Island and followed the Tennessee River to The Great Bend where he reported the Tali, a band of the Cherokee. From Great Bend, the Spanish left the river and began an overland course towards the Coosa River. On the overland journey Desoto noted the village of another band of the Cherokee

called the Tassqui. Making his way west, DeSoto met the Chickasaw at the headwaters of the Tombigbee and Tallahatchie Rivers. The Chickasaw nearly destroyed DeSoto and he barely escaped to the Mississippi River, where the Casqui took him in (Altschul 1980a:48).

Twenty years after Desoto, Tristan DeLuna was appointed to found a colony at Mobile Bay, and backtracking DeSoto's trail, DeLuna was unable to find the large settlement at Coca that DeSoto had mentioned. DeLuna failed to establish a colony and returned to Florida. After his departure, the Middle Tennessee Valley was relatively undisturbed by European explorers for 150 years (Dye 1985:15). During the respite from European influence, major settlement upheavals occurred within the groups of the Tennessee River Valley (Altschul 1980a:48).

The Kaskinampo had moved across the Mississippi, up the Cumberland River and south to an island near the Great Bend of the Tennessee River by Juan Pardo's last expedition in 1567. They continued to move upriver and by 1701 had relocated to the southern tip of Pine Island. By this time most of the Koasati had moved to the Coosa River but remnants of the tribe still lived on the northern end of the island. The two groups eventually merged and, in turn, were absorbed by the Cherokee Nation. Other tribes also merged with the Cherokee. A split among the Tuskegee had half the tribe relocate and in doing so, were soon absorbed by the Cherokee. By 1701 the Tali and Yuchi were also absorbed (Altschul 1980a 49).

Chickasaw tribes began to resettle near the mouth of the Tennessee River between 1690 and 1700 and were ultimately responsible for the eastward movement of the small tribes. The withdrawal of the smaller tribes opened the area for the Shawnee who were traditionally located in the Cumberland River Valley to the North. The Shawnee began to move into the Tennessee Valley between 1660 and 1715. From the very beginning the Shawnee and the Cherokee related poorly and by 1690 it became an annual custom for the Cherokee to raid the Shawnee during January and February. The Shawnee did well in the area and built several large permanent settlements. However, once the Chickasaw moved into the area, the Shawnee were expelled from the valley (circa 1715) through a combined force of Cherokee and Chickasaw. Neither of the victors recognized the efforts of the others (Altschul 1980a:49).

The balance of power on the Tennessee River was divided among the Cherokee, the Creek and the Chickasaw by 1715. European encroachment during the following 50 years pushed the three tribes into the Middle Tennessee Valley. This brought them into what had traditionally served as a buffer zone between the groups. When the Cherokee and the Creek came into direct contact in 1755 they began a war that ended with a Cherokee victory and caused the Creek to leave the Tennessee Valley entirely. The Cherokee fought the Chickasaw from 1764 until their defeat in 1769 after which both tribes retreated from the valley leaving it almost uninhabited. The Treaty of Hopewell in 1786 codified the positions of the two tribes drawing an indefinite line through Madison County. Finally, through a series of land cessions, the Chickasaw were removed to Texas and Oklahoma in 1832 and the Cherokee in 1835 (Dye 1985:16).

While there has been little archeological research devoted to the Protohistoric Period in the region surrounding Redstone Arsenal, Flemming's (1976) thesis research from the Gunterville Basin provides a comparative perspective which should be utilized in developing a research perspective on the Protohistory of the region.

The Historic Period

Between the years of 1493 and 1865 the land encompassing what is now Madison County was claimed by several European groups. The earliest claim belonged to the Spanish (1493), but they failed to establish any colonies and their claim dwindled until finally relinquished in 1740 (Dye 1985:16). The English claimed the area in 1497, but didn't make concerted efforts towards its pacification until the success of the fur trade at the end of seventeenth century made it profitable to do so. France's designs on the area were very similar to those of the English and in 1524 they staked their own claim. With the loss of the Seven Years War in 1763 France relinquished its claim to England (Altschul 1980b:52). England finally ceded its claim to the United States in 1783 following the American Revolution (Alexander 1979:20).

Although Spain, France and England were the major claimants to the Madison County area, several smaller entities were in control of various areas for limited periods. The area was claimed by the state of Georgia from 1733 to 1802. The claim was made in response to the action of 1732 which made those portions of South Carolina that lay west of the Savannah River a colony of Georgia (Alexander 1979:20). Georgia had sold the property to the Yazoo Land Company by 1789, but six years previously the Cherokee had sold some of the same property included in the Georgia-Yazoo sale to the William Blount Company. Conflicting ideas of property rights continued until 1802 when Alabama was ceded to the United States as part of the Mississippi territory (Altschul 1980b:52).

The first white settler of the area was probably John "Old Man" Ditto (circa 1800). He built a ferry on the Tennessee River called Ditto's Ferry to transport pioneers between Chattanooga and Colbert's Ferry. While Ditto was establishing his ferry, Joseph and Isaac Criner and Stephen McBroom were exploring the Northern portion of the county and built a cabin on the Mountain Fork of the Flint River in 1804. John Hunt and a man named Bean arrived soon after in search of "Big Springs," which, according to Indian legend, should have been an ideal location for settlement. Bean returned to Tennessee but Hunt remained to build a cabin and brought his family to settle (Altschul 1980b:53, Dye 1985:17).

The Chickasaws and the Cherokees still claimed portions of the territory after the 1802 cession, but by 1806 all their claims were quieted either by treaty or by land purchase (Alexander 1979:20, Dye 1985:17). As a result of these actions an area of 345,600 acres was opened and on December 13, 1808, Madison County, named just six days after Madison's election as president, was established (Altschul 1980b:5). Settlement of Madison County was swift and by 1809 the

population of illegal squatters was estimated at 5,000. At this point, the county was closed to further settlement. President Madison then ordered a census of the county to identify already established claims and to facilitate a more organized and legal settlement (Altschul 1980b:53).

Sale of the land acquired from Indians was also ordered. The sale of the Indian lands changed the course of Madison County history. The majority of lands were purchased by the so-called "gentry" families from Virginia, South Carolina and Georgia instead of the original frontiersmen settlers of the area (Altschul 1980b:53). These families were financially well equipped to recognize the potential of the land and were fully prepared to take advantage of it. Many families moved their entire households: slaves, furniture and family (Dye 1985:18). These families were instrumental in shaping cultural change within Madison County. They facilitated a conversion of the economic base of the region from one of subsistence agriculture to one based on cotton production. Large scale cotton production brought with it the plantation system, slaves included. Members of these families became central figures in the community dominating public and civic offices as well as the social sphere (Altschul 1980b:53, Dye 1985:18).

Of the new "gentry" that moved to Madison County one of the most influential was Leroy Pope. A shrewd speculator, he bought 1,000 acres of land around Big Spring for $23.00 an acre while already in possession of the knowledge that the Mississippi Territory had set up a commission to locate a county seat for the area. Pope donated a portion of the land he purchased for a town square and then sold the rest to the town for $25.00 an acre. Pope was also responsible for the town's original name, Twickenham, named for Alexander Pope's home in England (Altschul 1980b:55). The name didn't last long. Because of anti-English sentiments in 1810 the residents began to demand a name change to recognize the original settlers of the area. The name Twickenham was changed to Huntsville to honor John Hunt on November 25, 1811 (Alexander 1979:23).

Huntsville grew quickly after its incorporation in 1811. It was visited by many dignitaries such as General Andrew Jackson and his troops in 1813. They camped at the intersection of Lincoln and East Holmes Streets. During his stay, Jackson recruited four companies to accompany him to the "Creek War" at Horseshoe Bend (Alexander 1979:23). President James Monroe made a surprise stop in Huntsville in June of 1819 while traveling through the Western states. Soon after Monroe's visit, Huntsville played host to the constitutional convention at which a constitution for Alabama was drafted, a governor was elected and senators and federal judges were selected. Alabama became a state on December 4, 1819 and Huntsville was named the temporary capital until state buildings could be constructed in Cahaba (Altschul 1980b:56).

The growth of Huntsville was further facilitated in the 1820's by new and more efficient forms of transportation and communication. In the early 1820's the first stage line through Alabama located its terminus in Huntsville (Alexander 1979:24). A canal was built to connect Triana, a small port on the Tennessee River, to Huntsville and it was opened in 1827 causing a boom in

Triana. Better transportation contributed to making Madison County a major cotton center from 1820 through 1860 (Altschul 1980b:56).

Before the beginning of the Civil War between 50 and 85 percent of the white families in the county owned slaves. In spite of this, a vote in 1861 showed that 70 percent of the county residents voted against seceding from the union. When war did break out, however, Madison County backed the Confederacy fully. Because of its strategic importance to the Confederacy as a supply depot as well as a railroad terminus, Huntsville was a prime target for the Union forces. In April of 1862, Huntsville as well as 200 soldiers and 15 locomotives was captured by Brigadier General Mitchell. The city was soon recaptured by the Confederacy and then taken again by the Union in July 1863 (Altschul 1980b:56).

After 1863 the involvement of Madison County in the Civil War was minimal. Like other Southern areas with a plantation based economy, the defeat of the Confederacy was devastating to the local economy. Two hundred and fifty thousand bales of cotton were being produced annually by 1860, but in 1878 cotton production had dropped to 25,000 bales yearly. Production began to increase slowly in the late nineteenth and early twentieth centuries but did not fully recover until after the boll weevil blight in the southern part of Alabama in the 1920's allowed the Tennessee Valley to reemerge as a leading cotton producing region (Altschul 1980b:57)

The Redstone Arsenal was originally designated the Huntsville Arsenal and was purchased by the U.S. Department of the Army for the Chemical Warfare Service in 1941. The original purchase was made from some 320 families and included 31,998 acres with an additional 1,990 acres later included with an agreement from the Tennessee Valley Authority. The facility was built with the purpose of supplying an army of 2.8 million with chemical munitions. Upon its completion in 1943, the Huntsville arsenal was the largest chemical warfare plant in the world and a nearly self sufficient city with 11 manufacturing plants, four chemical-loading plants, plant storage, laboratories, offices, shops, a hospital, fire and police departments, roads, and railroads (Altschul 1980b:60-61). For a more complete treatment of the history of the Redstone Arsenal see Altschul, 1980b, in *Cultural Resources Investigations at Redstone Arsenal Madison County, Alabama.*

PREVIOUS CULTURAL RESOURCE INVESTIGATIONS

Dr. David Dye from Memphis State University has prepared an archeological overview and management plan for Redstone Arsenal and has summarized the previous archeological investigations conducted on the facility between the years 1932 and 1983. The discussion presented below will therefore refrain from duplicating Dye's summary and focus instead on those investigations most directly related to the present project. For a complete project history of archeological investigations conducted at Redstone Arsenal before 1983, the reader is referred to the Redstone Arsenal overview (Dye 1985).

In 1978, a literature search and field reconnaissance was undertaken by the Office of Archaeological Research of the University of Alabama. As part of this investigation, 43 areas totalling 340 acres were inspected using both pedestrian survey and limited subsurface sampling techniques (Alexander 1979). One of these 43 areas included a five acre tract of land located within the proposed Neal Road Extension Corridor along the west bank of McDonald Creek Swamp. Inspection of this five acre tract was part of the development program of the Rod and Gun Club. The survey of this property identified eight sites (1Ma22, 1Ma111, 1Ma112, 1Ma113, 1Ma114, 1Ma115, 1Ma116, 1Ma117) tightly clustered along the upper terraces or low lying ridges overlooking the swamp. In discussing the characteristics of these sites, Alexander (1979:46, 72-80) classified seven sites as lithic scatters and one site (Site 1Ma22) as a large campsite or village. Data useful for dating the sites were scant or absent altogether with five of the eight sites yielding no diagnostic cultural materials. Alternatively, the reconnaissance survey recovered a single Middle Archaic Morrow Mountain projectile point from Site 1Ma111, a Woodland Period Bradley Spike point in addition to historic period artifacts from Site 1Ma114, and a Woodland Period McIntyre point from Site 1Ma116 (Alexander 1979). Other site characteristics as well as Alexander's significance evaluations are presented below in Table 2.

Table 2. Site Characteristics and Significance Evaluations of Sites Located on The Rod and Gun Property in 1978.

Site #	Elevation	Size	Dist. to Water	Evaluation
1Ma22	nd	nd	Near Swamp	Undetermined
1Ma111	580-590 ft.	66 ft. in dia.	Near Creek	Not Significant
1Ma112	580-600 ft.	130 by 66 ft.	165 ft.	Undetermined
1Ma113	590-600 ft.	164 by 100 ft.	245 ft.	Not Significant
1Ma114	590-600 ft.	230 by 164 ft.	410 ft.	Undetermined
1Ma115	590-600 ft.	500 by 66 ft.	410 ft.	Undetermined
1Ma116	570-580 ft.	230 ft. in dia.	130 ft.	Significant
1Ma117	580-600 ft.	80 ft. in dia.	165 ft.	Not Significant

nd.: data not provided
Source of data is Alexander 1979.

In 1980, New World Research completed a 20 percent survey of a proposed alternate corridor of the DDT Contamination Study along the southeastern boundary of Redstone Arsenal. A small area of this project corridor overlaps with the proposed corridor for the Neal Road Extension Corridor north of Martin Road and west of the Visitor Recreation Center and the Martin Road Gate. While no sites were discovered in the present Neal Road Extension Corridor, New World Research did discover 22 new sites and tested 26 previously recorded or newly discovered sites (Thomas 1980:xix) south and east of the present project area. Analysis of the artifact collections and site locations indicate that the area was occupied from Paleoindian through historic times and that Archaic and

Woodland Period special activity sites usually occur on bottomland knolls in association with Etowah or Decatur-Cumberland soils near swamps. Geomorphic investigations of several knolls in the Huntsville Spring Branch Basin further suggest that these bottomland features are not of alluvial origin, but instead exhibit weathered profiles similar to those found in upland contexts (Lenzer 1980:118). This information is important when considering the potential for buried sites in the arsenal.

The final investigation to be summarized in relation to the Neal Road Extension Corridor is the cultural resource survey of the proposed construction site for BMD Headquarters and borrow pit areas (Jordan and King 1985). The survey completed by the Office of Archaeological Research of the University of Alabama in 1985 included a borrow pit area located within the proposed Neal Road Extension Corridor. This parcel of land encompasses the area west of Huntsville Spring Branch and north of Martin Road to the section line dividing Sections 26 and 27. Three archeological sites (1Ma281, 1Ma282, 1Ma283) were discovered during this survey. Site 1Ma281 represents a large site located along the bluff line overlooking the west bank of Huntsville Spring Branch. Shovel testing along the bluff indicates a variable artifact density suggesting the possibility of multiple occupations with both Paleoindian and Archaic Period artifacts recovered from the investigations (Jordan and King 1985). Artifacts recovered beneath the plow zone provide added significance to the site as one of the few recorded upland sites containing undisturbed cultural deposits. Investigations of the remaining two sites discovered during the survey yielded little new significant data. Site 1Ma282 represented the remains of a heavily disturbed post-1911 farm house, while site 1Ma283 represented a diffuse low density lithic scatter.

The results of two investigations are important in considering the testing and evaluation of the Dry Boat Storage Facility. The first of these projects is the investigation of site 1Ma126 conducted by OSM Archeological Consultants of Northport, Alabama. This site, located immediately north of the proposed boat storage area, contains numerous cultural features and diagnostic artifacts representative of the Early Archaic through Woodland Periods. One of the more significant discoveries at site 1Ma126 was a human burial which was bisected by a backhoe trench. Investigation of this feature (Feature 12) revealed that the corpse (an adult male) was placed in a cylindrical pit lined with limestone slabs and capped with large quartz cobbles. A diverse array of artifacts were also interred with the individual and included:

> five projectile points... two chipped stone preforms or blanks; a piece of cut antler, which may have been used as a hammer in chipped stone tool production; a beaver tooth, a rodent tooth, an antler tip, ... a large flake, a piece of chert... and a large cobble with damage on one side suggesting use as a hammerstone (Oakley and Driskell 1985:61).

Although a radiocarbon date taken from the bone material yielded a date of approximately 100 B. C. (uncorrected), the burial was determined to be of the Late

Archaic or Gulf Formational Period based on the presence of four Wade projectile points found in the grave.

Investigation of Site 1Ma126 indicated that surface content of the site had been severely disturbed by plowing and erosion; however, valuable information pertaining to burial customs, artifact assemblages, and subsistence data still exists at the site (Oakley and Driskell 1985:71). Of particular interest is the possibility of intact Early Archaic features, which could provide vital information on this otherwise poorly documented period in Middle Tennessee Valley prehistory. Based on these findings, Site 1Ma126 was considered a significant resource and worthy of inclusion to the National Register of Historic Places.

In 1990, archeologists from the Corps of Engineers, Mobile District conducted an intensive survey of the proposed boat storage facility located immediately south of Site 1Ma126. The area encompassing the proposed facility is bounded to the south and west by roads and to the east by the Tennessee Valley Authority (TVA) property line. On the northwest corner of the parcel, a storage igloo was constructed during World War II and according to Redstone personnel, the entire parcel was once a staging area for the manufacture of concrete used in constructing the igloo complex. Related to this activity, several poured concrete pads and broken pieces of concrete were observed over much of the eastern half of the site. A borrow pit, also related to igloo construction, is located along the levee crest in the northeast section of the parcel.

The archeological survey consisted of shovel/auger test units placed every 20 to 30 feet along nine transects bisecting the four acre site area in both north-south and east-west directions (US Army Corps of Engineers, Mobile District 1990). The results of this study indicated the presence of a prehistoric archeological site with a relatively high artifact concentration centered along the levee ridge crest. This ridge runs parallel to the TVA property line and continues northward to the area encompassing Site 1Ma126. Given the documented importance of Site 1Ma126 and its proximity to the proposed dry boat storage facility, additional testing was recommended to ascertain whether the materials found at the proposed boat facility represent a distinct archeological occupation or an extension of the occupations found at Site 1Ma126.

III. RESEARCH DESIGN

RESEARCH OBJECTIVES AND FIELD METHODS

Two objectives guided this study: 1) the evaluation of a known archeological site within the Dry Boat Storage Facility property, and 2) the discovery, recordation, and assessment of all historic properties (including archeological sites) lying within the proposed Neal Road Extension Corridor. The methods employed by New South Associates for completing these tasks are discussed below. It is important to note that the following discussions will, for the most part, use metric measurements followed by English equivalents in parentheses, since both the site grid system used at Site 1Ma126 and the shovel transect system used during the Neal Road Extension Corridor survey were originally conceived using the metric system.

Task 1, the evaluative testing of the Dry Boat Storage Facility, consisted of vertical and horizontal site boundary definitions, the recovery of sufficient samples to identify cultural components, and the determination of the presence/absence (or potential presence/absence) of subsurface cultural features or middens. Of critical importance to this study was the recovery of data documenting the relationship of the archeological manifestations found at the proposed storage facility to those found at site 1Ma126, a site already recommended as eligible to the National Register of Historic Places (Oakley and Driskell 1987). Two criteria were established to assess this relationship. The archeological manifestations found at the Dry Boat Storage Facility would be considered a part of site 1Ma126 if positive shovel tests extended into the defined limits of site 1Ma126 or if the components found at the Dry Boat Storage Facility were contemporaneous with those found at site 1Ma126 and a distance of less than 50 meters (164 feet) separated the two manifestations. Conversely, if different components were identified and the distance separating the two manifestations exceeded 50 meters (164 feet), then the cultural manifestations at the Dry Boat Storage Facility would be considered a different site.

The investigative work at the proposed Dry Boat Storage Facility began by establishing a site datum near the center of the proposed facility. This location also corresponds to the approximate center of the site core area (measuring 150 by 60 meters [492 by 197 feet]) as defined by the Mobile District, U. S. Army Corps of Engineers (1990). The site datum was assigned the grid coordinates N500/E500 and from this point a five meter grid system was constructed using a transit and fifty meter tape. Labelling of grid point intersections then proceeded by determining the location of each grid intersection in relation to the site datum coordinates. For example, if a grid point intersection was located 10 meters north and east of the datum, it was assigned a provenience of N510/E510. Likewise, if a grid intersection was located 10 meters south and west of the datum, it was assigned a provenience of N490/E490. Each grid line then served as a shovel test transect whereby individual shovel test units excavated along a transect were

identified by their unique provenience number. The general rule followed by the shovel testing operation was that the shovel test excavations would continue at a 5 meter spacing along a transect until two consecutive units yielded no cultural materials or a natural site boundary (i.e. swamp, bluff line, etc.) was encountered. It was necessary to modify this plan, however, when the shovel test operation yielded cultural materials over a much larger area than originally proposed. To systematically and efficiently cover this larger area, the grid was enlarged to a 20 meter (65.6 foot) interval outside of the originally defined site core area. All shovel test units were excavated to sterile red clay subsoil and all fill dirt from these units were screened through 1/4 inch mesh hardware cloth.

Artifacts recovered from each shovel test unit were bagged separately. A provenience card noting the site number, date, the shovel test provenience number, collection comments, and names of excavators were placed in each shovel test bag. Surface collections from the site were given separate proveniences and were appropriately bagged with the same information described above.

In addition to the shovel test units, more intensive testing of the Dry Boat Storage Facility was undertaken to examine the vertical extent of the cultural deposits. Originally, the work plan called for the excavation of eight 2 by 2 meter (2.2 by 2.2 yard) units in the areas designated by the shovel testing operation as containing unusual artifact concentrations and/or deeply buried cultural components. Like the short interval shovel test strategy, this plan was modified due to the additional time and effort required to adequately determine the site boundaries. Instead of the eight 2 by 2 meter units, eight 1 by 2 meter (1.1 by 2.2 yard) units were completed. This change in level of effort was approved by the Mobile Corps of Engineers' Technical Representative. The excavation of these units proceeded in 10 centimeter (4 inch) levels (proveniences) within natural soil strata with the fill dirt passed through 1/4 inch mesh hardware cloth. Artifacts recovered from these excavation units were bagged according to their provenience and a provenience card was inserted into each bag. Detailed notes and records were kept for each unit and included unit/level forms, scaled drawings of the profiles, and photographs.

Task II, a Phase I cultural resources survey of the proposed Neal Road Extension Corridor, involved a judgmental survey strategy whereby all areas of high site potential received close-interval shovel test transect survey (30 meter [32.8 yard] interval), and all other areas received walkover pedestrian coverage at a wider interval (60 meters [65.6 yards]). Wetlands, covering an area of approximately 80 hectares (200 acres), were not surveyed. Included as part of this task was an assessment of all known cultural resources within the project corridor. The examination of previously recorded sites in the project corridor was necessary to assess modern impacts at these locations, to accurately determine site boundaries, and to collect new data for upgrading archeological site forms.

The procedure for excavating shovel test nits involved the standard round shovel excavations with all soil removed from th se excavations (approximately 30 cm [12 inches] in diameter) screened through 1/4 inch hardware cloth mesh.

Detailed notes were taken on each positive shovel test, recording its location, the soil stratigraphy encountered, and the types and quantities of cultural materials present. The locations of all excavations producing cultural artifacts were noted on the project base maps, and each positive test was noted by a provenience designation. In addition to the shovel test transects, areas judged to have good site potential, but not located along a transect grid, received a judgmental excavation.

For standardization purposes an archeological site during the Phase I survey was defined by the presence of 10 or more pre-1930's artifacts from: (1) any single subsurface context; (2) any two or more contiguous subsurface excavations; (3) any combination of subsurface and surface artifact occurrences within a 60 meter radius; or (4) any surface contexts within a 40 meter radius. Occurrences of less than 10 artifacts from any of the contexts defined above were considered as isolated finds. The location of all isolated finds were placed on project field maps; however, no additional work was conducted at such occurrences. All artifacts recovered during the project were bagged by provenience and returned to the laboratory for analysis.

LABORATORY METHODS

Upon conclusion of the field work, all materials were returned to New South Associates' Stone Mountain, Georgia, office for processing and analysis. Materials were first washed and cataloged. All diagnostic artifacts were labelled with the site number and assigned a catalog number. The artifacts were first categorized by raw material (i.e., lithic, ceramic, bone, etc.). Ceramic artifacts were analyzed according to their temper, surface treatment, and cultural-historical types (if identifiable). More detailed analysis of Lithic artifacts focused on the attributes of form (i.e., debitage, tool, etc.), type (i.e., primary flake, projectile point), and subtype (i.e., Eva, Wade, Pickwick points).

The analyses began by sorting all of the artifacts into 10 categories, including hafted bifaces/projectile points, general bifaces (no haft element), unifaces, cores, debitage, hammerstones, pitted cobbles, fire cracked rock, other lithics, and ceramics. These major artifact categories are described below.

Hafted Bifaces/Projectile Points. This category represents all bifacially worked tools with haft elements. Incorporation of the hafted biface terminology into what has traditionally been called projectile points is a product of the recognition that many of the artifacts subsumed under this category are in fact multifunctional tools (Ahler 1971). The analysis conducted on this artifact category is typological by nature and focuses its attention on the assignment of the artifact to cultural-historical periods.

General Bifaces. This category includes bifacially worked stone tools encompassing a wide variety of shapes and sizes. Previous research has

indicated that tools included in this category served a multitude of functions, ranging from preforms (Frison and Bradley 1980) to bifacial cores (Binford 1977, Cable 1982) In an effort to distinguish between possible functions and manufacturing processes, this category is divided into two subgroups based on size and edge characteristics. *Subgroup 1* bifaces consist of large and often thick, asymmetrical masses of rock which exhibit minimal attempts to form a bifacial edge. Flake scars along the lateral margins of these bifaces are relatively large, resulting in a sinuous edge. These tools are believed to be early stage preforms or bifacial cores. In either case, since no effort was expended to create a finished marginal edge, they would be less effective as cutting implements. *Subgroup 2* bifaces consist of smaller, well thinned, and often symmetrical tools exhibiting intentional edge straightening by direct percussion or pressure flaking. These tools are thought to represent late stage preforms or finished bifacial cutters and/or scrapers.

Unifaces. This category is composed of flake tools including utilized and modified flakes. No effort was made to distinguish between possible uniface types based on size and shape categories, edge angles, or degree of edge modification. It is believed that this artifact category represents expediently manufactured cutting and scraping implements.

Cores. This category consists of large masses of various rock types which have no observable bulb of percussion and exhibit one surface where one or more flakes have been detached. This category serves as a source of material for the production of all other lithic tool forms. Also, cores themselves can function as tools or preforms if necessary.

Debitage. This category consists of the manufacturing and maintenance by-products of the chipped stone industry. Materials placed within the debitage category were further divided into five subgroups representing a proposed reduction sequence (cf. White et al. 1963). *Subgroup 1* represents debitage produced from the initial reduction of a core. The flakes detached at this stage retained cortex covering over 90 percent of their dorsal surfaces. Flakes which are classified as belonging to this subgroup are called primary flakes. *Subgroup 2* follows Subgroup 1 in the reduction sequence. Flakes within this group exhibit less than 90 percent cortex on their dorsal surface. These flakes are called secondary flakes. *Subgroup 3* represents the terminal end of the reduction process as flakes are small (<20mm in length), well formed, and exhibit more pronounced curvature of their ventral surface. Flakes of this type are called tertiary flakes. *Subgroup 4* represents flakes that are so broken or unidentifiable as to preclude their inclusion into one of the other categories. *Subgroup 5* consists of angular shaped pieces of raw material formed as a result of angular shearing presumably during the earliest stages of the reduction sequence. Artifacts within this subgroup are called shatter (cf. House and Ballenger 1976).

Hammerstones. This category represents large, rounded masses (usually cobbles) of raw material which exhibit battering along their margins. Functionally, these implements were used as a percussor in the manufacture of lithic tools and/or crushing bone and plant material.

Pitted Cobbles. This category consists of large masses of raw material with pecked or abraded depressions on one or more surfaces. It has been proposed that these depressions are the result of plant processing (nut cracking) and bipolar anvil flaking (Spears 1977). In many instances, pitted cobbles exhibit the same battering characteristics as hammerstones, suggesting the multifunctional and overlapping use of these two artifact categories.

Fire-Cracked Rock. This category represents masses of lithic material which have been altered by the process of heating. These materials are usually interpreted as evidence of food preparation, whereby cobbles were heated and placed in earth ovens or used for boiling water.

Other Lithics. This category included lithic materials not falling into the above categories. Examples of other lithics include ground stone tools, axes, adzes, and drills. These types of artifacts are rarely found in large numbers and their presence in the collections are easily noted under this residual category.

Ceramics. The goal of the ceramic analysis was originally proposed as an intensive examination and recordation of the ceramic collections. This was to be accomplished through a detailed analysis of variables and attributes for the various ceramic forms. Unfortunately, the ceramic collections returned from Redstone Arsenal were so small and eroded that little information could be obtained beyond their temper and surface finish.

Once analysed, all artifacts were sorted and bagged in separate plastic bags. These bags contain the full provenience information available for each specimen, including the project name, site name, site number, excavation provenience (i.e. unit or shovel test number), county, state, collecting institution, and date. These artifacts were then boxed in standard, curation quality boxes which were sorted and organized by consecutive bag numbers. Each box was labelled with the project information and the bag numbers contained therein.

SITE EVALUATIONS: PRACTICAL AND THEORETICAL CONSIDERATIONS

As previously stated, the objectives of this study included the evaluation of a known archeological site within the Dry Boat Storage Facility and the discovery, recordation, and a significance assessment of all historic properties lying within the proposed Neal Road Extension Corridor. Before a site can be evaluated as a significant resource, it must meet one or more of four specific criteria: A, B, C, or D established in 36 CFR Part 60, National Register of Historic Places, Nominations by State and Federal Agencies and 36 CFR Part 800, Advisory Council on Historic Preservation, Protection of Historic and Cultural Properties. These criteria function within the context of relevant historical themes or patterns identified as important by the project's research design. The four criteria are:

Criterion A:	Properties that are associated with events that have made a significant contribution to broad patterns of our history;
Criterion B:	Properties that are associated with lives of persons significant in our past;
Criterion C:	Properties that embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that posses high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; and
Criterion D:	Properties that have yielded, or may be likely to yield, important information in prehistory or history.

The evaluation of an archeological site for inclusion on the National Register of Historic Places normally rests on the research potential of that site. Most archaeological sites are listed under Criterion D - "have yielded or may be likely to yield information important in prehistory or history." While this criterion is necessarily flexible, it is recognized that factors concerning the state of current knowledge for a region must be considered in combination with an evaluation of site integrity (McGimsey and Davis 1977:33; Bulter 1987). A number of research themes were thus recognized which structured the evaluation of cultural resources at Redstone Arsenal, in tandem with site preservation.

The theoretical perspective underpinning the project's research design is derived from hunter-gatherer studies and ethnographic research. Archeological research has identified a number of cultural-ecological dimensions in which past subsistence-settlement systems may vary. Most importantly, it has shown that environmental variables of resource density, resource diversity, and resource structure influence the organization of subsistence strategies, which largely determines the nature of settlement systems, the degree of mobility, and demography (Binford 1980, Kelly 1983). To phrase this another way, settlement strategies are developed as the result of subsistence needs, and as such, each occupational site within the settlement system should reflect among other things the economic importance of that location. Also, as economic pursuits vary among the different site locations, variation is expected to occur in both site characteristics and the formal-functional categories of tools used in the process of conducting activities at a site.

Temperate zones, like the one found in northern Alabama, pose interesting problems for the organization and adoption of subsistence-settlement strategies. Because temperate zones represent the "middle ground" between environments conducive for either residential and logistical mobility strategies, a mixed strategy

utilizing aspects of both is expected to occur (Binford 1980). In combining aspects of both strategies, the procurement system can be responsive to both seasonal and yearly fluctuations in the resource base.

Site types based on the organizational and behavioral characteristics of forager and logistical based mobility strategies have been defined by Binford (1980) and elaborated upon by numerous other investigators (Carlson 1979, Brown and Vierra 1983, Speth 1983, Thomas 1983). Residentially mobile groups are called foragers and by the nature of their adaptation are expected to produce two site types: base camps and locations. Base camps may be occupied for an indefinite period depending on the availability of resources. Archeological residues associated with residential base camps include evidence of a generalized technology, low diversity of feature types, low interassemblage variability (unless sites are occupied during the same seasons), the presence of a high diversity of prey species, and a diverse array of anatomical parts from prey species (Chatters 1987). Locations are the second site type created by foragers. These sites are short-term occupations at which procurement of a targeted resource is accomplished. Since these occupations are brief and directed towards a specific resource, the quantity and diversity of tool and feature types present is expected to be very low or nonexistent.

Alternatively, groups that practice a logistical mobility strategy are called collectors. Collectors exhibit five different kinds of sites including base camps, locations, field camps, stations, and caches. Archeologically, base camps created by logistically-organized groups can be distinguished from residentially-organized base camps by such attributes as interassemblage variability, assemblage diversity, and anatomical part distribution (Binford 1978, 1982; Carlson 1979; Speth 1983; Thomas 1983; Chatters 1987). Logistically-organized base camps should contain less diverse assemblages than residential camps, evidence of specialized technologies, a high feature diversity, more redundancy in interassemblage composition, and a lower representation of specific anatomical parts from prey species (Chatters 1987:340-344). Sites referred to as field camps represent bases of operations for field parties, where the focus of activity centers around the procurement of a limited number of resources. Since tasks are narrowly focused on such sites, a low diversity of potential food species, features, and tool types should be present. Interassemblage variability among these sites is expected to be highly redundant, with only a few tool classes comprising the artifact assemblage. In field camps located at a distance from the base camp, anatomical parts of prey species will reflect an over-representation of less valuable bones, while very little bone residue is expected on field camps located near the base camp (Chatters 1987:342-343). This is especially true if the prey species are small enough to transport back to the base camp in one piece.

The fourth type of site used by collectors is the station. Stations are places where information is gathered concerning spatial and temporal variations in food resources. Caches, on the other hand, are places where stored foods are maintained until they can be transported back to the base camp. Both stations and caches are difficult to detect archeologically.

Previous research undertaken at Redstone Arsenal has indicated that the settlement strategy of certain prehistoric periods was possibly tied to swamp environments, and specifically that occupations clustered on bottomland knolls near swamp margins (Thomas 1980). While little data presently exists on the internal structure or occupational histories of such sites, it is likely that their formation process involved repeated occupation through time. Interestingly, not all cultural periods appear to be equally represented at these locations. Thomas et al. (1980) observed that swamp environments located further from the Tennessee River were occupied by Archaic groups, while sites located closer to the Tennessee River exhibited Archaic through Mississippian occupations. Why, then, was there such a shift in the functional use of space, or, to be more specific, why were swamp edge sites particularly advantageous for Archaic groups but not Woodland or Mississippian groups? Settlement-environment associations thus provide an important research theme for the project.

Complicating the study of occupational events and the functional use of space within Redstone Arsenal is the problem of post-depositional disturbance. Research thus must consider not only the problem of overlapping occupations, but other processes that serve to alter or mix the original depositional integrity of the archeological remains. On sites exhibiting low rates of soil deposition, like those surrounding swamps (Lenzer 1980), consideration of these processes becomes more critical, given that much of the artifactual material is contained in the upper-most levels, the levels most likely to receive the greatest disturbances. It is predictable then, that many of the sites discovered at Redstone Arsenal will show the effects of disturbances caused by tree throws, root churning, animal burrows, vandalism, clear cutting, and plowing that are commonly associated with shallow sites (Schiffer 1976; House and Wogaman 1978; Lewarch and O'Brien 1981; Odell and Cowan 1987, 1990; Dunnell 1990; Yorston 1990).

Probably the most destructive post-depositional force at work on Redstone Arsenal sites is erosion. As noted in the Soil Survey of Madison County (Swenson et al. 1958), the topography and soils at Redstone Arsenal are conducive to moderate to severe erosion. Observations made by early European explorers traveling in the Piedmont and Ridge and Valley provinces to the south of the project area suggest that erosion was minimal during aboriginal times. During these times, erosion generally occurred as the result of sheet erosion in the mountains, restricted stream erosion, small scale Indian agricultural plots, sporadic forest fires, and animal trails (Trimble 1974:127). Widespread and intensive erosion, on the other hand, occurred throughout the deep South and Atlantic Slope regions after European settlement. The establishment of a cash-crop economy resulted in the abandonment of old fields once they were depleted of their nutrients and the clearing of new fields. Eventually much of the Southeastern United States consisted of abandoned fields that were severely eroded, gullied, and stripped of their topsoil. While the area surrounding the present day location of Redstone Arsenal exhibited less erosive land use patterns than other southeastern regions studied by Trimble (1974), erosional processes brought about by the combined effects of deforestation, rainfall, and plowing have no doubt impacted the spatial integrity of artifacts in the project area.

The degree to which the disturbances noted above impact an archeological site will vary according to the site's environmental setting and land use history. It is reasonable to assume post-depositional disturbances will be greatest on sites that have a long history of agricultural activities and that are located in areas of high to moderate relief. Conversely, sites located in broad, level, settings that have no history or a relatively short history of agricultural activity are expected to exhibit less post-depositional disturbances and greater structural integrity. Erosion may also benefit sites occurring in floodplain settings, by yielding greater alluviation which in turn would serve to bury and preserve such sites. While the dichotomy between upland slope and bottomland flat conditions may be overly simplistic, it does illustrate the variable nature of post-depositional processes and the necessity for conducting further investigations on the spatial context of artifacts and the degree these processes have altered the archeological record at Redstone Arsenal.

Regardless of the spatial integrity of material remains, sites at Redstone Arsenal are expected to exhibit high surface content visibility in which the entire archeological record or content of a site is expressed on or near the present ground surface. Working in a similar soil depositional environment, Cable and Cantley (n.d.: 87) have argued that sites exhibiting these characteristics:

> will reflect the totality of use and reuse of a specific type of behavioral locus, a locus that can be considered a staging area for behavior related to the loss, discard, breakage, and deposit of most non-perishable items of the archeological record, namely the elements of lithic, ceramic, and metal technology. The archeological site properties of size and artifact quantity, then, are gross measures of the intensity of use and reuse of a particular locus.... Variability across these measures within and between microenvironments will give gross indications of differences in land use patterns.

Shallow, disturbed, sites can therefore provide important data on such problem domains as occupational history, the intensity of occupation(s), reoccupation of preferred landforms, and the functions of sites within behavioral systems. These are particularly important research concerns in regions where processual studies are beginning to emerge, and only a small number of sites have been completely investigated.

To facilitate the objectives of the present study, field work activities were designed to provide information on such site characteristics as site size and artifact density. Laboratory analyses on the other hand, sought to identify the occupational history and function of sites by monitoring variation in the formal and functional characteristics of artifacts along five levels, including: (1) the identification of culture-historic diagnostics, (2) functional variation in tool categories, (3) variation in the manufacturing stages of artifacts, (4) variation in raw material selection for tool manufacturing, and (5) variation in the reduction stages represented by the various artifact categories. It was realized from the

outset that some of these goals could not be achieved due to limitations of a Phase I survey; however, by attempting to answer questions such as these, gaps in our present knowledge could be identified and addressed by future studies.

IV. PROJECT RESULTS

INTRODUCTION

The results of the testing and survey phases of the Redstone Arsenal Project are presented below. First, the investigative results of the proposed Dry Boat Storage Facility are described, including a summary of the shovel test unit data and descriptions of artifacts and soil stratigraphies revealed in the excavation units. A review of the project objectives for this testing program follows. The second half of this chapter presents the results of the Neal Road Extension Corridor survey.

RESULTS OF THE DRY BOAT STORAGE FACILITY INVESTIGATION

The first stage of the Dry Boat Storage Facility investigation involved the use of shovel tests to determine the boundaries of the artifact scatter previously noted (Mobile Corps 1990) (Figure 3). Shovel test pits were placed at a five meter (5.5 yard) grid interval over the site core and at a 20 meter (22 yard) interval in the surrounding areas. A total of 272 shovel tests were excavated across the alluvial terrace from the TVA property line to the western flank of the bottom lands (Figure 4). Of these 272 units, 204 yielded lithic and/or ceramic cultural material. This material included: 27 primary flakes, 225 secondary flakes, 187 interior flakes, 643 thinning flakes, 221 unidentifiable flake fragments, 131 pieces of shatter/chunks, 21 pieces of fire cracked rock, 9 cores or core fragments, 28 unifacial flake tools, 5 non-hafted bifaces, 14 whole or broken projectile points, and 35 small eroded pottery sherds.

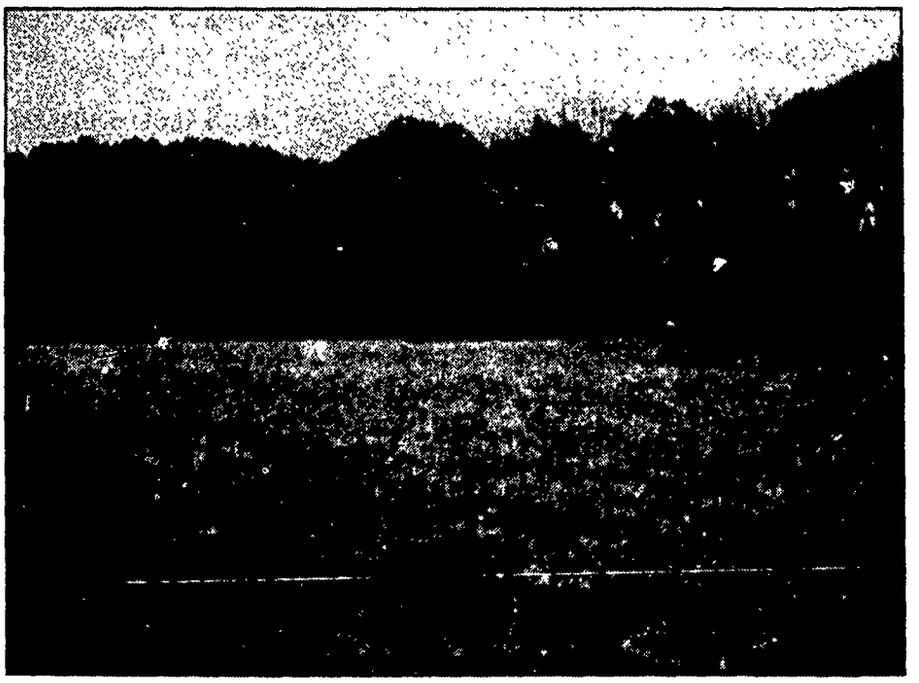
Within the projectile point tool category, 13 of the 14 tools were fragmentary, comprised of unidentifiable tip, lateral, and/or basal sections. The one whole specimen represents a medium-sized dart point with a contracting stem and a slightly excurvate blade edge. Projectile points fitting this description are c assified as Gary points and are found in both Archaic and Woodland Period occupations in north Alabama.

A Woodland Period occupation of this site is supported by the presence of limestone-tempered pottery. All 35 sherds comprising the ceramic sample exhibited circular to semi-circular holes in their surfaces where the limestone temper has weathered out of the paste. These sherds appear to be Mulberry Creek Plain wares that are commonly found on Early Woodland occupations in the central Tennessee Valley (Sears and Griffin 1950, Walthall 1980).

The greatest density of cultural materials recovered by the systematic shovel testing operation came from the levee ridge crest and the swale area to the west. Along the levee crest, artifact abundance was lowest in the southern region

Figure 3
Site 1Ma126

A. Shovel testing within the proposed Dry Boat-Storage Facility. View looking to the north across site area.



B. Shovel testing north of proposed Dry Boat Storage Facility, view looking to the northeast. University of Alabama investigations conducted in the field north of crew members.

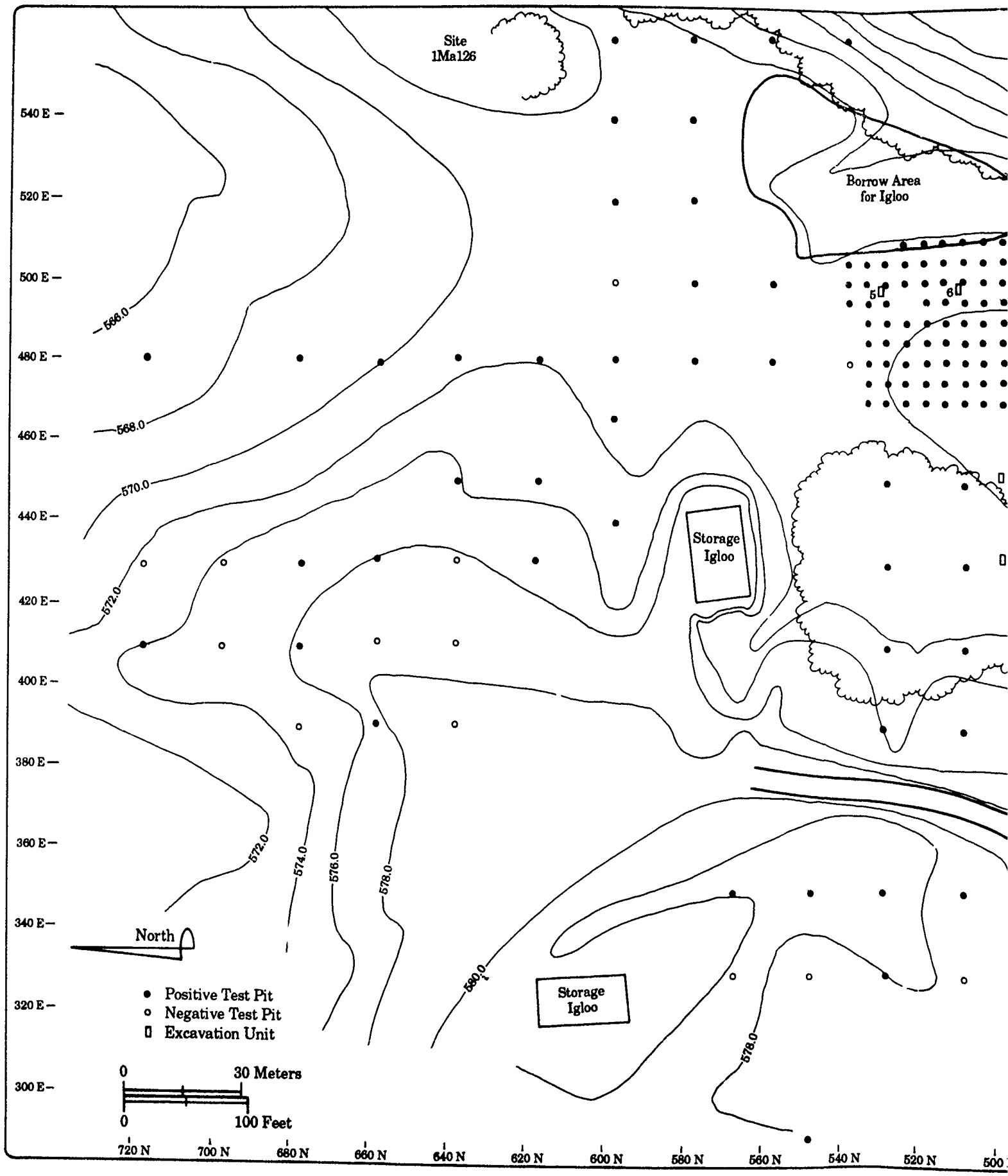
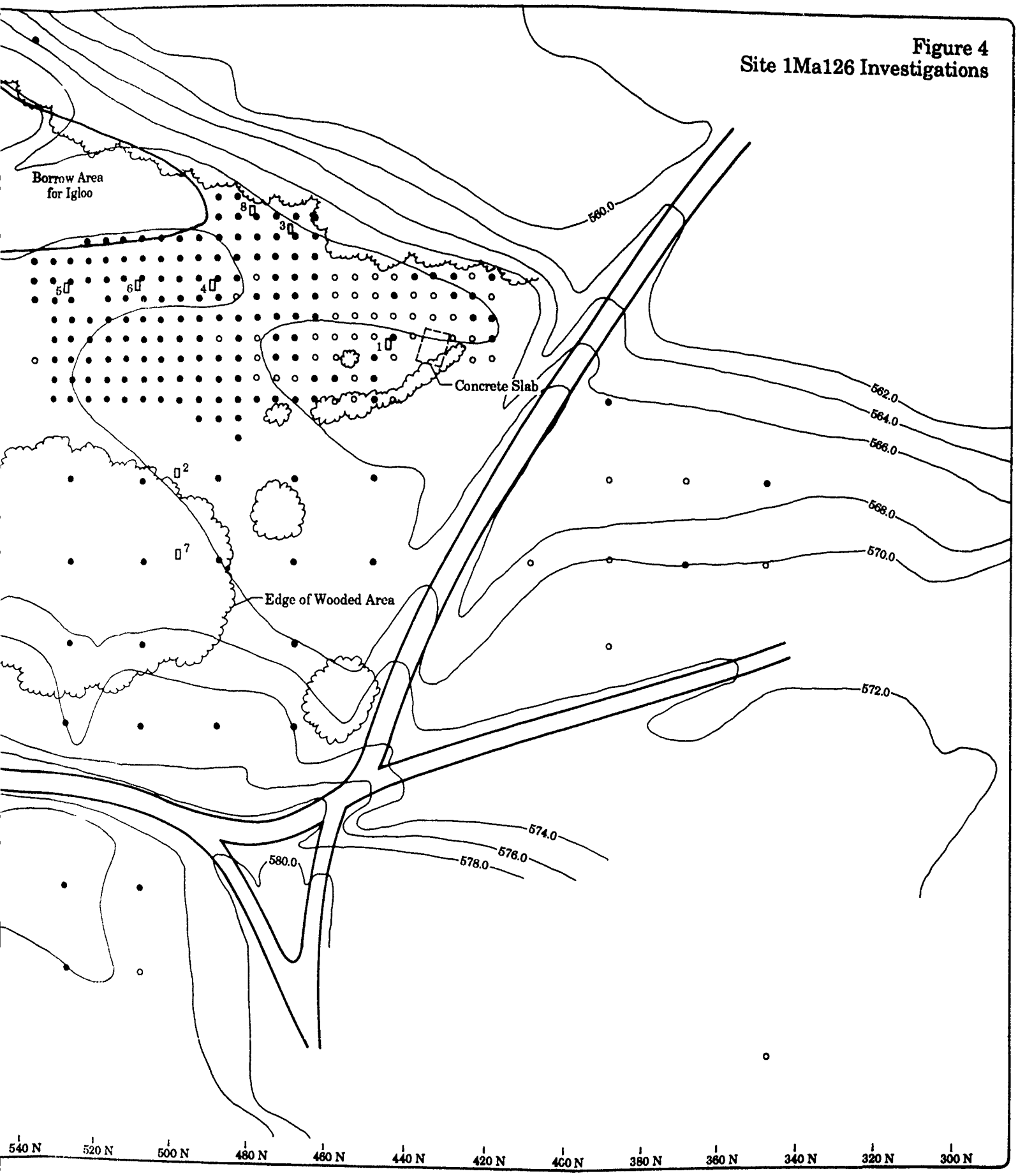

Site
1Ma126
Borrow Area
for Igloo
Storage
Igloo
Storage
Igloo
566.0
568.0
570.0
572.0
572.0
574.0
576.0
578.0
580.0
578.0
North
Positive Test Pit
Negative Test Pit
Excavation Unit
0
30 Meters
0
100 Feet
540 E
520 E
500 E
480 E
460 E
440 E
420 E
400 E
380 E
360 E
340 E
320 E
300 E
720 N
700 N
680 N
660 N
640 N
620 N
600 N
580 N
560 N
540 N
520 N

Figure 4
Site 1Ma126 Investigations



of the proposed storage facility, but increased dramatically in the northern regions. The highest density of materials occurred adjacent to the borrow pit, which had removed a portion of the levee. In this area, it was not uncommon to recover 10 or more artifacts per shovel test unit. Interestingly, all of the cultural material along the levee crest represented lithic tools; no ceramics were found in this area. The ceramics were distributed throughout the swale area and to the north of the proposed facility site. The swale, located west of the levee crest, exhibited the deepest soil profiles encountered during the shovel test pit operation. Also, a high density artifact concentration was noted for the wooded area south of the storage igloo and west of the swale.

The results of the shovel test operation confirmed that the materials recovered from the proposed Dry Boat Storage Facility site represent a southwestern extension of site 1Ma126. Systematic shovel testing north of the proposed facility consistently yielded cultural materials along the terrace crest and back-slope to the area previously identified as site 1Ma126. Furthermore, the shovel test pit data shows the site extends westward across the igloo access road to the foot of the uplands. Much of this area however, has been severely disturbed by igloo construction during World War II. To the south (south of the road leading to the recreational area) few artifacts were recovered from shovel test pits placed along the military/TVA property line. East of this property line, the area appears to be severely disturbed by roads leading to the recreation area, lodge, and filtration plant. Shovel test pits placed along transects running parallel to these roads failed to yield cultural material.

After concluding the shovel test pit operation, examination of the vertical distribution of cultural deposits continued with the placement of eight 1 by 2 meter (1.1 by 2.2 yard) excavation units (EU's). These units were placed in areas where the shovel test pit data suggested the presence of relatively deep soil deposits, unusually rich artifact concentrations, or areas capable of yielding information on post-depositional disturbances at the site. Figure 4 shows the distribution of excavation units selected during this stage of the field work. Unit 1 was located in the southern half of the proposed storage facility to better determine the origin and function of the concrete slabs and clay/gravel layers, which appeared in the profiles of shovel test pits excavated along the levee crest. Presumably, these post-depositional disturbances date to the World War II period when the site area was used for the production of concrete (Bill Schroder, personal communication 1990). Units 2 and 7 were placed west of the levee crest to investigate the artifact concentration occurring in the swale and wooded areas. As noted above, shovel testing in the swale area revealed deep soil deposits, while the wooded area yielded large quantities of cultural material. The remainder of the excavation units (EU's 3, 4, 5, 6, 8) were located along the levee ridge crest and front slope where shovel testing yielded large quantities of lithic materials.

Excavation Unit 1 was located along the back slope of the levee crest and contained deposits extending to a depth of 40 centimeters (16 inches) below ground surface. However, the eastern half of the unit was excavated to a depth of 45 centimeters (18 inches) to further inspect the subsoil deposits occurring in this

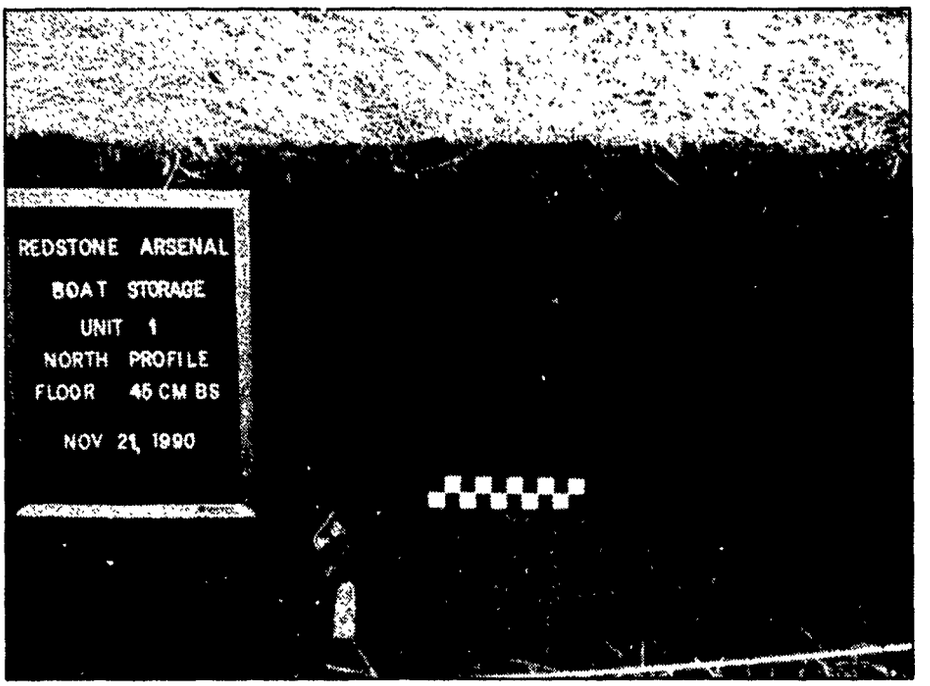
area of the site (Figure 5). Below the sod layer, the uppermost soil layer consisted of a red (2.5YR4/6) clay deposit that was heavily mixed with gravel, charcoal, and late historic period artifacts. Underlying this deposit was a thick dark brown (7.5YR4/4) clayey loam, mottled with small red clay nodules, that contained prehistoric artifacts but no historic materials. At a depth of 25 to 28 centimeters (9 to 11 inches), a transitional zone occurred where the mottling decreased and the quantity of prehistoric materials increased. The morphology of this 5 to 8 centimeter (2 to 3 inch) thick deposit and the absence of mottling suggests that this zone may in fact represent the remains of a naturally occurring, but truncated, soil horizon. Interestingly, the increase in cultural material noted in the bottom of excavation Level 3 and the top of Level 4 corresponds to this transitional deposit. The lower half of excavation Level 4 and all of excavation Level 5 were contained within the yellowish red (5YR4/8) clay subsoil. These excavations noted the presence of artifacts resting on the clay surface but not within its matrix. Table 3 summarizes the artifacts and their vertical distribution recovered in Excavation Unit 1.

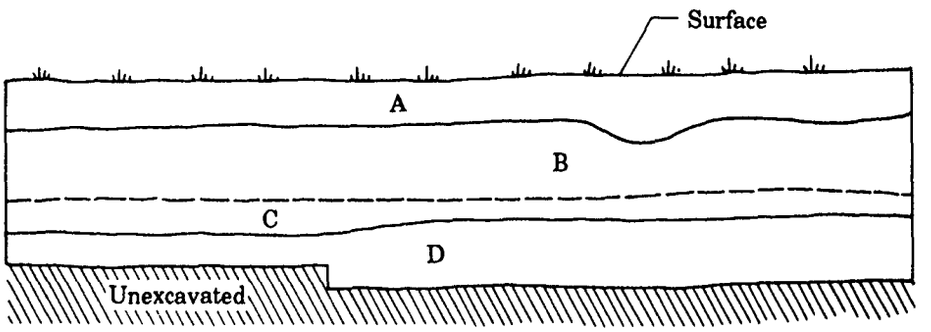
Table 3. Site 1Ma126, Excavation Unit 1 Artifacts.

Categories	Level 1	Level 2	Level 3	Level 4	Totals
Debitage					
Primary Flake	3		1	1	5
Secondary Flake	4	1	1	9	15
Interior Flake	4		4	5	13
Thinning Flake	8	9	29	28	74
Unidentified Flake	3	2	4	9	18
Shatter/Chunk			2	1	3
Fire Cracked Rock		1			1
Core/ Tools					
Core				1	1
Projectile Point					
Biface				1	1
Unifacial Tool	1		2		3
Ceramic					
Shell					
Bone					
Historic Artifact	21				21
Totals	44	13	43	55	155

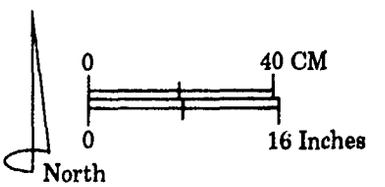
It is important to note the discrepancies in the results of the shovel test operation and the excavation unit in the southern region of the proposed facility. This region yielded few cultural materials during the shovel testing, yet a relatively large quantity of artifacts were recovered by the excavation unit. This contrast is due in large part by the surveyors' failure to recognize the clay cap as a man-made deposit. Originally, no attempt was made to penetrate this deposit because it was interpreted as subsoil occurring along a highly eroded surface. The results obtained from Excavation Unit 1 demonstrate the error in this

Figure 5
Excavation Unit 1 North Profile, Site 1Ma126





A- 2.5YR4/6 Red Clay with Charcoal and Rock Inclusions
B- 7.5YR4/4 Dark Brown Clayey Loam
C- Transition Zone
D- 5YR4/8 Yellowish Red Clay



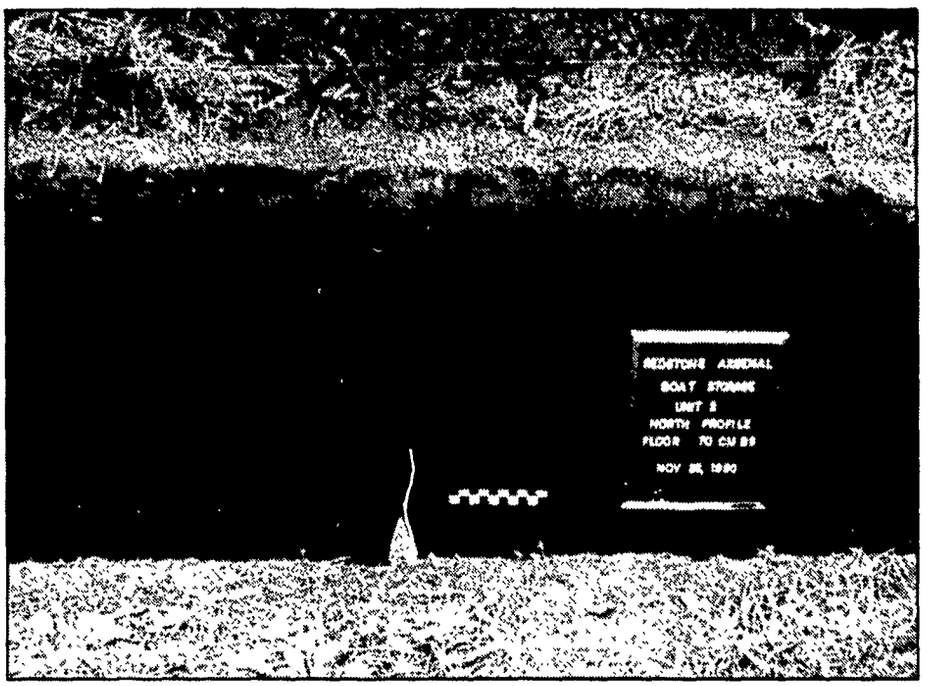
thinking, and indicate that the shovel test data for this area of the site is biased. Furthermore, the results of Excavation Unit 1 suggest that this area may contain remnants of an intact soil deposit (containing artifacts), possibly preserved via the protection offered by the clay cap to the underlying soils.

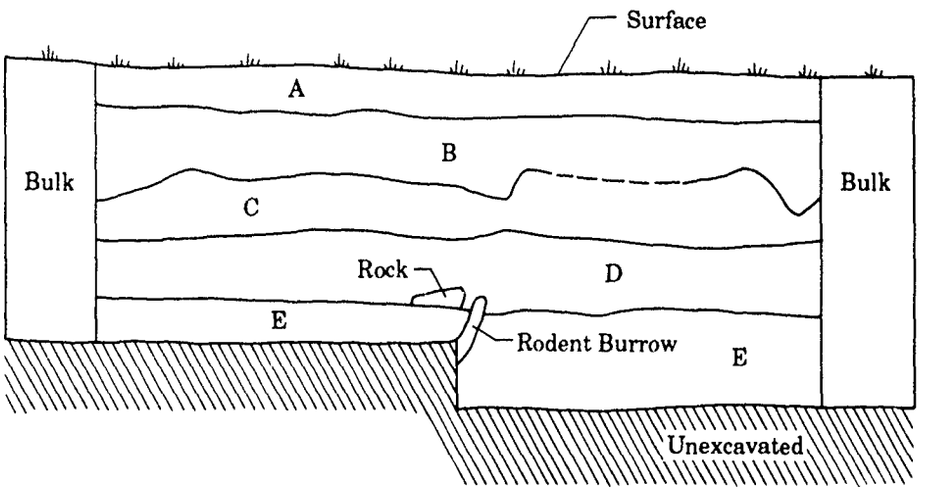
Excavation Unit 2, located in the swale area, revealed a slightly different soil profile from the one encountered in Unit 1 (Figure 6). In this area of the site a thin sod layer capped a recently deposited zone of dark yellowish brown (10YR4/4) loam. The yellowish brown loam deposit was approximately 10 centimeters (4 inches) thick, and peeled away in large sheets, exposing the surface of a brown (7.5YR4/4) sandy loam stratum. The brown sandy loam stratum was approximately 20 centimeters (8 inches) thick and extended to a depth of 30 centimeters (12 inches) below ground surface. Below this depth, dark reddish brown (5YR3/4) sandy loam and dark reddish brown (5YR3/3) clayey loam deposits were encountered in the excavation. Differentiation between these two horizons were based on differences in clay content, color hue, and the amount of charcoal occurring in the matrix. Beneath the lower loam deposit was yellowish red (5YR4/6) clay subsoil.

Artifacts were distributed vertically throughout the excavation unit, however, excavation Levels 2, 3, and 4 contained the majority of the cultural material (Table 4). Levels 2 and 3 correspond to the excavation of the brown sandy loam deposit, which was interpreted as a buried plow zone because of the observable plow furrows located along the base of this deposit (Figure 6) and the mixture of later prehistoric and historic materials in the matrix. Excavation Level 4, on the other hand, was completed entirely within the lower dark reddish brown sandy loam deposit beneath the plow zone. The excavations at this level yielded a relatively large collection of artifacts including an Early Archaic Kirk projectile point and three Early Woodland limestone-tempered pottery sherds. Below excavation Level 4, the artifact density significantly decreased in the dark reddish brown clayey loam and yellowish red clay deposits. Artifacts found within these deposits consisted primarily of debitage, a few tools, and a single limestone-tempered sherd. These findings indicate the downward percolation of materials in the lower levels, which is not unexpected given the small size of the artifacts (particularly the pottery sherds) and the numerous tree root and rodent burrows encountered throughout the unit. The effects of post-depositional disturbances such as these are difficult to monitor without implementation of time-consuming and costly excavation procedures, which carefully identify, isolate, and remove disturbed areas from the remainder of the excavation.

Excavation Unit 3, located on the front slope of the levee, revealed the presence of disturbed deposits extending eastward from the levee crest to the point near the TVA property line. Soil deposits in this area were very shallow with the yellowish red (5YR4/6) clay subsoil occurring at an average depth of 18 centimeters (7 inches) below ground surface. Beneath the sod layer, the red clay/gravel cap overlaid a dark reddish brown (5YR3/4) sandy loam deposit containing both prehistoric and historic artifacts (Table 5).

Figure 6
Excavation Unit 2 North Profile, Site 1Ma126





A- 10YR4/4 Dark Yellowish Brown Loam
B- 7.5YR4 Brown Sandy Loam
C- 5YR3/4 Dark Reddish Brown Sandy Loam
D- 5YR3/3 Dark Reddish Brown Clayey Loam
E- 5YR4/6 Yellowish Red Clay

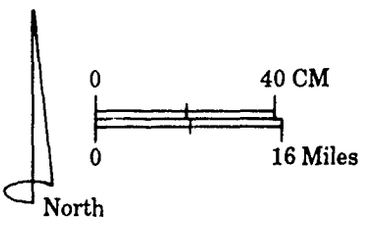


Table 4. Site 1Ma126, Excavation Unit 2 Artifacts.

Categories	Level 1	Level 2	Level 3	Level 4	Level5	Level 6	Level 7	Totals
Debitage								
Primary Flake			3	3	2			8
Secondary Flake	1	20	40	42	5	1	1	110
Interior Flake		18	19	13	3	2		55
Thinning Flake	2	66	42	42	6	4	4	166
Unidentified Flake		30	35	10		2		77
Shatter/Chunk	1	20	34	9	2	1		67
Fire Cracked Rock		3	1	3		7		14
Core/ Tools								
Core		1		2	1			4
Projectile Point				1				1
Point Fragment		1		1				2
Biface				1				1
Unifacial Tool		1	1	3				5
Ceramic		12	3	3	1			19
Shell		3						3
Bone			2	1				3
Historic Artifact		1						1
Totals	4	176	180	134	20	17	5	536

Table 5. Site 1Ma126, Excavation Unit 3 Artifacts.

Categories	Level 1	Level 2	Level 3	Totals
Debitage				
Primary Flake				
Secondary Flake	8	28	5	41
Interior Flake	16	19		35
Thinning Flake	22	75	4	101
Unidentified Flake	6	19	2	27
Shatter/Chunk	5	31	2	38
Fire Cracked Rock	1	1		2
Core/ Tools				
Core	2	2		4
Projectile Point		1		1
Biface		1		1
Unifacial Tool	2	2		4
Ceramic	2			2
Shell		1		1
Bone				
Historic Artifact	5			5
Totals	69	180	13	262

The lowermost soil deposit in this unit consisted of a reddish brown (5YR4/4) sandy loam that was loosely compact and appeared to be disturbed; however, no evidence of this disturbance was noted in the artifact collection. Included in the Level 2 collections was a broken, small projectile point, which was tentatively identified as belonging to the Woodland Period. Below the reddish brown sandy loam deposit (corresponding to excavation Level 2), the artifact density dropped significantly, with all artifacts occurring near the surface of the yellowish red clay zone.

Excavation Unit 4 was located on top of the levee crest in an area designated as a high-density artifact concentration. Excavations at this location revealed a soil profile consisting of an uppermost brown (7.5YR4/4) sandy loam overlying an 8 to 10 centimeter (3 to 4 inch) thick reddish brown (5YR4/4) sandy loam deposit. Beneath these deposits, at a depth of approximately 20 centimeters (8 inches), was the yellowish red (5YR4/6) clay subsoil (Figure 7). During the excavation, a large quantity of gravel was noted in the top 7 centimeters (3 inches) of the unit and was removed as a separate level (Level 1). Materials recovered from this level included a large amount of lithic shatter, debitage, historic glass, and a broken New Market projectile point with a rounded base and slightly excurvate blade edge (Cambron and Hulse 1975: 96).

Below the gravels the artifact density increased in Level 2. Artifacts recovered in this level include large quantities of debitage and shatter, a core, bifaces, fire cracked rock, and two projectile point tips (Table 6). At the base of Level 2, plow scars became apparent in the underlying reddish brown sandy loam deposit. This deposit (Level 3) contained the greatest quantity of artifacts (n=273) including large quantities of debitage and shatter, two projectile point bases (unidentifiable), a point tip, a biface, and unifacial tools. The plow scars noted in the previous level persisted throughout this level and continued into the clay subsoil in Level 4. At the level of the subsoil deposit, the plow scars were removed from the surrounding matrix (Figure 7). Subsequent excavation of the subsoil deposit yielded few artifacts (mostly small thinning flakes).

Excavation Unit 5 was located on the levee crest adjacent to the borrow pit near the northern boundary of the proposed storage facility. This unit had very little stratigraphy remaining, with a plow-disturbed reddish brown (5YR4/3) sandy loam overlying a dark reddish brown (5YR3/4) clay subsoil. The average depth of subsoil in this area was 12 centimeters (5 inches) below the surface. The greatest quantity of artifacts were recovered from Level 2 within the reddish brown sandy loam deposit. Near the bottom of the loam deposit the artifact density dropped significantly and only a small quantity of materials was recovered from the uppermost area of the clay subsoil (Table 7).

Excavation Unit 6 was located on the levee crest 20 meters (22 yards) south of Unit 5. The soil stratigraphy in Unit 6 was very similar to the stratigraphy of Unit 5, except that the uppermost surface contained large quantities of gravel at this location. This gravel layer was removed separately from the underlying soils

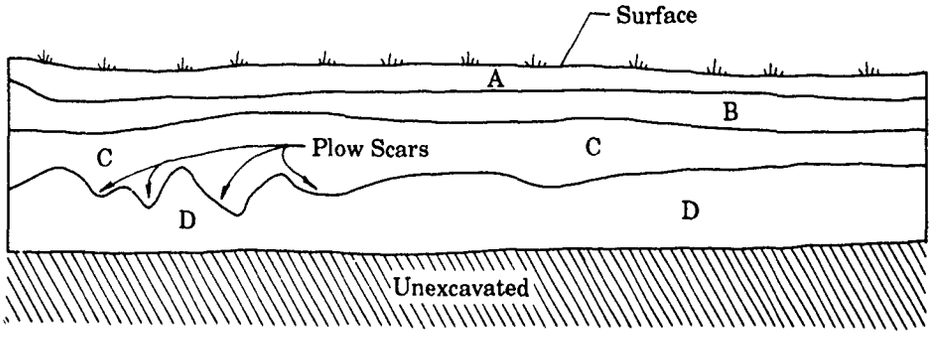
Table 6. Site 1Ma126, Excavation Unit 4 Artifacts.

Categories	Level 1	Level 2	Level 3	Level 4	Totals
Debitage					
Primary Flake	1	1	3		5
Secondary Flake	11	30	30	6	77
Interior Flake	8	25	27	2	62
Thinning Flake	7	73	97	24	201
Unidentified Flake	3	29	28	4	64
Shatter/Chunk	19	32	73	2	126
Fire Cracked Rock	1	3	7		11
Core/ Tools					
Core		1			1
Projectile Point	1				1
Point Fragment		2	3		5
Biface		2	1		3
Unifacial Tool			4		4
Ceramic					
Shell					
Bone					
Historic Artifact	1				1
Totals	52	198	273	38	561

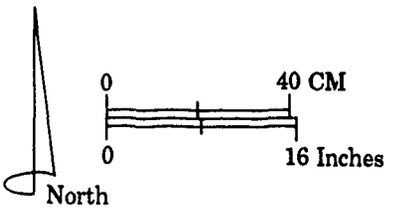
Table 7. Site 1Ma126, Excavation Unit 5 Artifacts.

Categories	Level 1	Level 2	Level 3	Level 4	Totals
Debitage					
Primary Flake					
Secondary Flake		29	5	3	37
Interior Flake	1	19	9	1	30
Thinning Flake	2	54	10	3	69
Unidentified Flake	2	18	8	5	33
Shatter/Chunk		56	7	1	64
Fire Cracked Rock	1	3	2	3	9
Core/ Tools					
Core		1		1	2
Projectile Point					
Biface		1			1
Unifacial Tool		1			1
Hammerstone		1			1
Ceramic					
Shell					
Bone					
Historic Artifact					
Totals	6	183	41	17	247

Figure 7
Excavation Unit 4 North Profile, Site 1Ma126



A- 7.5YR4/4 Brown Sandy Loam with Pebbles
B- 7.5YR4/4 Brown Sandy Loam
C- YR4/4 Reddish Brown Sandy Loam
D- 5YR4/6 Yellowish Red Clay



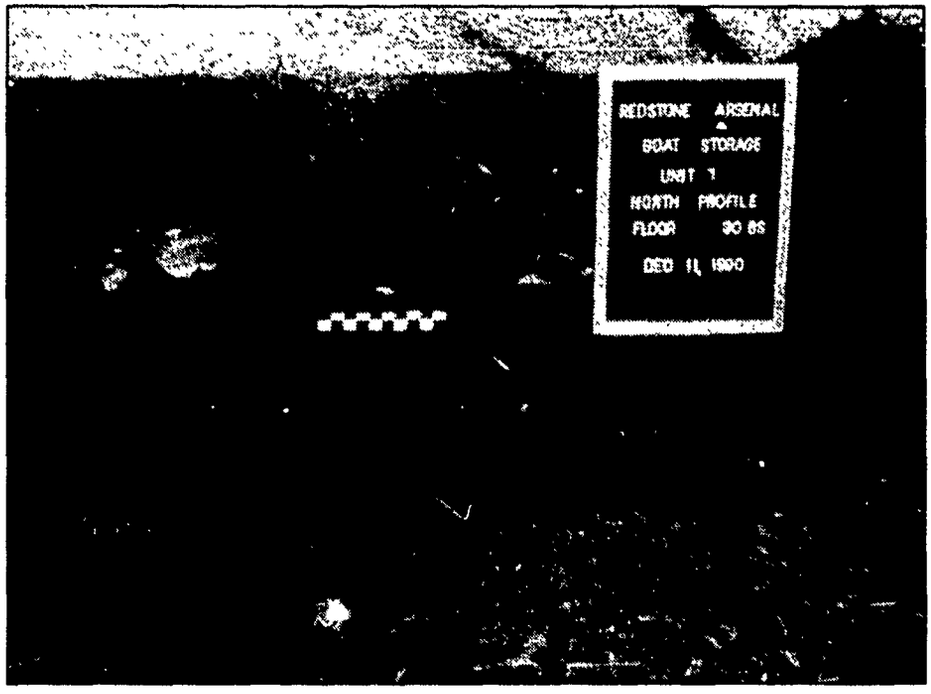
and corresponds to the Level 1 excavation of this unit. As shown in Table 8, this level contained a moderate amount of prehistoric debitage. Beneath the gravel layer was a thin deposit of loosely compact dark yellowish brown (10YR4/4) sandy loam that capped a thicker deposit of strongly compact yellowish brown (10YR5/4) sandy loam. Excavation of these two soil deposits (Levels 2 and 3) yielded large quantities of cultural materials including debitage and shatter, fire cracked rock, a core, bifaces, flake tools, and several broken projectile point fragments. One of these fragments appears to represent a basal section of a small Woodland or Mississippian Period tool. A small quantity of material was recovered from the uppermost area of the clay subsoil (Level 4) at a depth of approximately 20 centimeters (8 inches) below the surface. Although plow scars did not occur on the surface of the subsoil, a historic period nail was observed in the soil profile immediately above this surface.

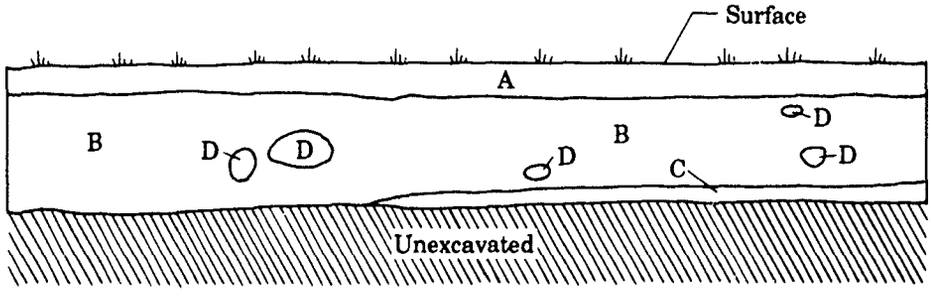
Table 8. Site 1Ma126, Excavation Unit 6 Artifacts.

Categories	Level 1	Level 2	Level 3	Level 4	Totals
Debitage					
Primary Flake	2	8	6	1	17
Secondary Flake	10	37	28	3	78
Interior Flake	5	41	20	2	68
Thinning Flake	9	66	51	14	140
Unidentified Flake	1	46	35	2	84
Shatter/Chunk	14	42	20		76
Fire Cracked Rock		3			3
Core/ Tools					
Core		1			1
Projectile Point					
Point Fragment		5			5
Biface		3	2		5
Unifacial Tool		1	2		3
Ceramic					
Shell					
Bone					
Historic Artifact		2			2
Totals	41	255	164	22	482

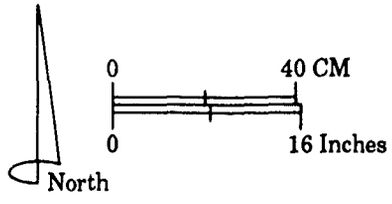
Excavation Unit 7 was located in a clump of trees west of the swale area. The first level of this excavation revealed a 5 centimeter (2 inch) thick humus zone that contained no cultural material. Level 2 was excavated through a thin layer of dark reddish brown (5YR3/4) loam that occurred below the humus zone. This deposit was heavily disturbed by tree roots (Figure 8) and yielded a single piece of debitage and one periwinkle shell. Levels 3 and 4, approximately 10 to 30 centimeters (4 to 12 inches) below ground surface, yielded the greatest quantities of cultural material corresponding to a dark reddish brown (2.5YR3/4) clayey

Figure 8
Excavation Unit 7 North Profile, Site 1Ma126





A - 5YR3/4 Dark Reddish Brown Loam
B - 2.5YR3/4 Dark Reddish Brown Clayey Loam
C - 2.5YR3/6 Dark Red Clay
D - Tree Roots



loam deposit (Table 9). Diagnostic materials recovered from these levels included several limestone tempered pottery sherds and a Swan Lake projectile point (Cambron and Hulse 1975:120) Below this latter deposit, the excavation encountered a dark red (2.5YR3/6) clay subsoil.

Table 9. Site 1Ma126, Excavation Unit 7 Artifacts.

Categories	Level 1	Level 2	Level 3	Level 4	Totals
Debitage					
Primary Flake			2	5	7
Secondary Flake			5	23	28
Interior Flake			6	14	20
Thinning Flake		1	24	46	71
Unidentified Flake			8	26	34
Shatter/Chunk				7	7
Fire Cracked Rock				1	1
Core/ Tools					
Core					
Projectile Point			2		2
Point Fragment			1		1
Biface			1	1	2
Unifacial Tool					
Ceramic			1	1	2
Shell		1	4	2	7
Bone				3	3
Historic Artifact					
Totals		2	54	129	185

Excavation Unit 8 was located on the front slope of the levee crest near the south end of the borrow pit. In the western half of this unit the uppermost deposit contained a mixture of gravel and a reddish brown (5YR5/5) sandy loam. These gravels tapered off in the eastern portion of the unit, leaving only the sandy loam deposit. Underlying the upper loam deposit and extending over the whole surface area of the unit was a thin mottled yellowish red (5YR4/6) sandy loam deposit. This deposit overlaid a red (2.5YR4/6) clay subsoil in the western half of the unit and a yellowish red sandy loam deposit (not mottled) in the eastern half of the unit. The unmottled loam deposit occurred only in the eastern portion of the unit and overlaid the red clay subsoil at this location. The majority of artifacts recovered at this location came from Level 2 or the mottled (disturbed) yellowish red sandy loam deposit (Table 10). Diagnostic materials from this zone included an Early Archaic Big Sandy projectile point and a piece of glass. The excavation below the mottled stratum focused on the eastern half of the unit within the homogeneous yellowish red, sandy loam deposit. Excavation Levels 3 and 4, conducted in this latter deposit, yielded fewer artifacts, primarily debitage.

Table 10. Site 1Ma126, Excavation Unit 8 Artifacts.

Categories	Level 1	Level 2	Level 3	Level 4	Totals
Debitage					
Primary Flake	1	5	3		9
Secondary Flake	5	33	8	6	52
Interior Flake	6	25	6		37
Thinning Flake	21	104	24	7	156
Unidentified Flake	8	43	12	4	67
Shatter/Chunk	2	24	6	1	33
Fire Cracked Rock					
Core/ Tools					
Core		4			4
Projectile Point		1			1
Point Fragment		1			1
Biface	2	2			4
Unifacial Tool	1	3			4
Ceramic					
Shell	2				2
Bone					
Historic Artifact		1			1
Totals	48	246	59	18	371

In summary, archeological investigations undertaken at the proposed Dry Boat Storage Facility yielded important new information on the distribution of cultural materials along the levee ridge crest and the regions to the west. The investigation of the ridge crest area determined that cultural materials extend from the southern boundary of the proposed facility northward to the previously recorded boundary of site 1Ma126. Gauging from the quantity and types of artifacts recovered from this area, the principal activity along the ridge crest focused on the production and maintenance of stone tools throughout the Archaic and Woodland cultural periods. During the later Woodland occupation, activities requiring the use of ceramics were evidently restricted to the regions west of the ridge crest. This may have been in response to the availability of fresh water that occasionally ponded in the swale area or from naturally flowing springs.

As can be expected, the preservational characteristics of a site this size varies across the site area. The ridge crest region, and particularly the uppermost deposits, have been heavily disturbed by plowing and activities associated with the production of concrete during World War II. Also, during this time a portion of the ridge crest was removed to cover the storage igloos in the site vicinity. Interestingly, these same activities that had such a severe impact on the site may have served to protect a small portion of the archeological deposits in the southern region of the proposed facility. In this area, excavation results indicate the presence of an intact deposit containing cultural materials in the lower level of Unit 1. This deposit is below the gravel/clay cap and buried plow zone. Other potentially intact deposits were noted in the swale and wooded areas to the west of the ridge crest. Although post-depositional disturbances (ie. animal

burrowing and tree roots) have served to mix materials, soil morphologies and overall soil depth in the swale and wooded area suggest that plowing and/or erosion had little impact on these deposits.

In conclusion, site testing conducted within and around the proposed Dry Boat Storage Facility has determined that the archeological manifestations occurring at this location are part of site 1Ma126. As site 1Ma126 has previously been determined to be eligible to the National Register of Historic Places, the Dry Boat Facility site area should be added to site 1Ma126's boundaries and this also recognized as a significant resource. Construction of the Dry Boat Storage Facility at this location would thus have an adverse impact on significant archeological remains.

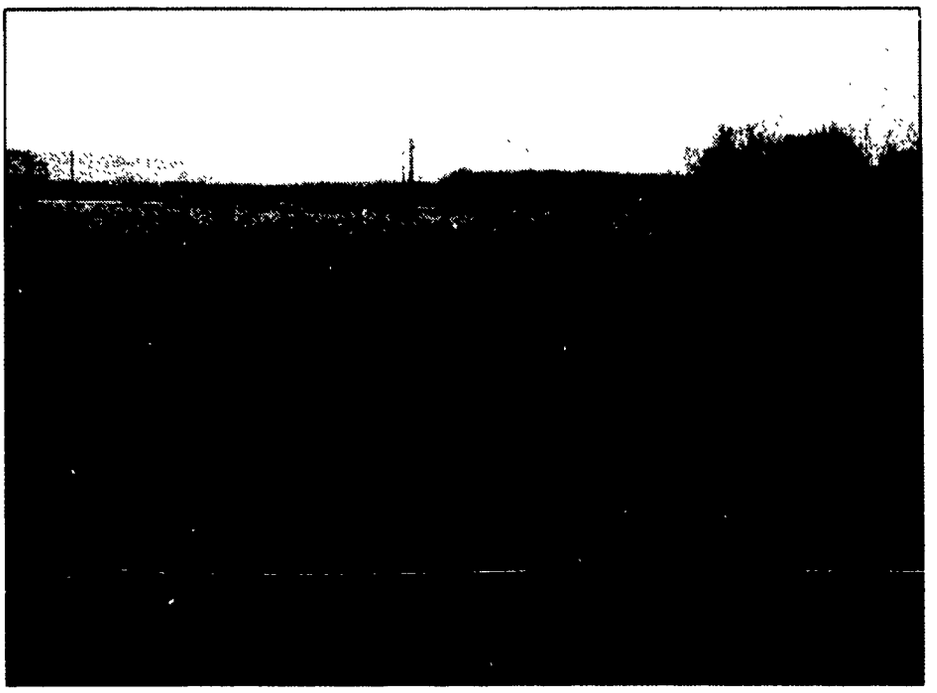
RESULTS OF THE NEAL ROAD EXTENSION CORRIDOR SURVEY

The results of the Phase I survey of the Neal Road Extension Corridor are discussed below. This discussion follows the traditional format for site descriptions and outlines the topographic landforms, present day land use, and artifact content of each site. The newly discovered sites identified by the present survey lists the temporary site numbers (in parentheses) after the official state site number. Consequently, sites that do not have temporary site number designations represent previously recorded sites that were revisited during the present survey.

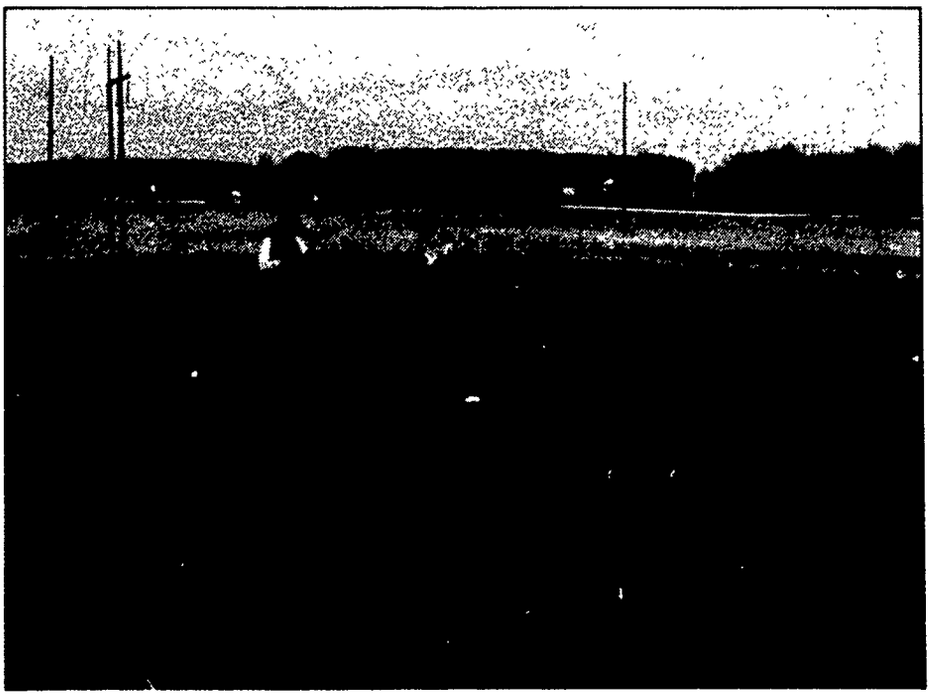
Site 1Ma22

This site represents a large lithic scatter covering the ridge crest, slopes, and upper alluvial terrace surrounding McDonald Creek swamp. The site is located on gently rolling terrain along the northern periphery of the swamp and extends in an easterly direction to the McDonald Creek channel (Figure 9A). The site area is estimated to cover approximately 13.8 hectares (34 acres). Presently, the majority of the site lies in pasture; however, its southern boundary is located within the wood line along the ridge crest that gradually diminishes into the bottom land swamp. Systematically placed shovel test pits dispersed across the site area (Figure 9B) revealed a relatively dense artifact concentration on the level ground in the northwest corner of the site (Figure 10). Several shovel test pits placed in this vicinity extended to a depth of 50 centimeters (20 inches) or more before reaching red clay subsoil. A historic period occupation was also located along the road leading to the pasture field, and consisted of two small rectangular earthen embankments or foundations. The function of these structures (domestic or agricultural) could not be determined due to severe ground disturbances; however, numerous pieces of ceramics, glass, and nails suggest that one of these structures may have served as a dwelling. Along the eastern perimeter of the site, near McDonald Creek, a shovel test pit encountered a possible cultural feature containing fired clay or daub. Discovered at a depth of 15 centimeters (6

Figure 9
Site 1Ma22

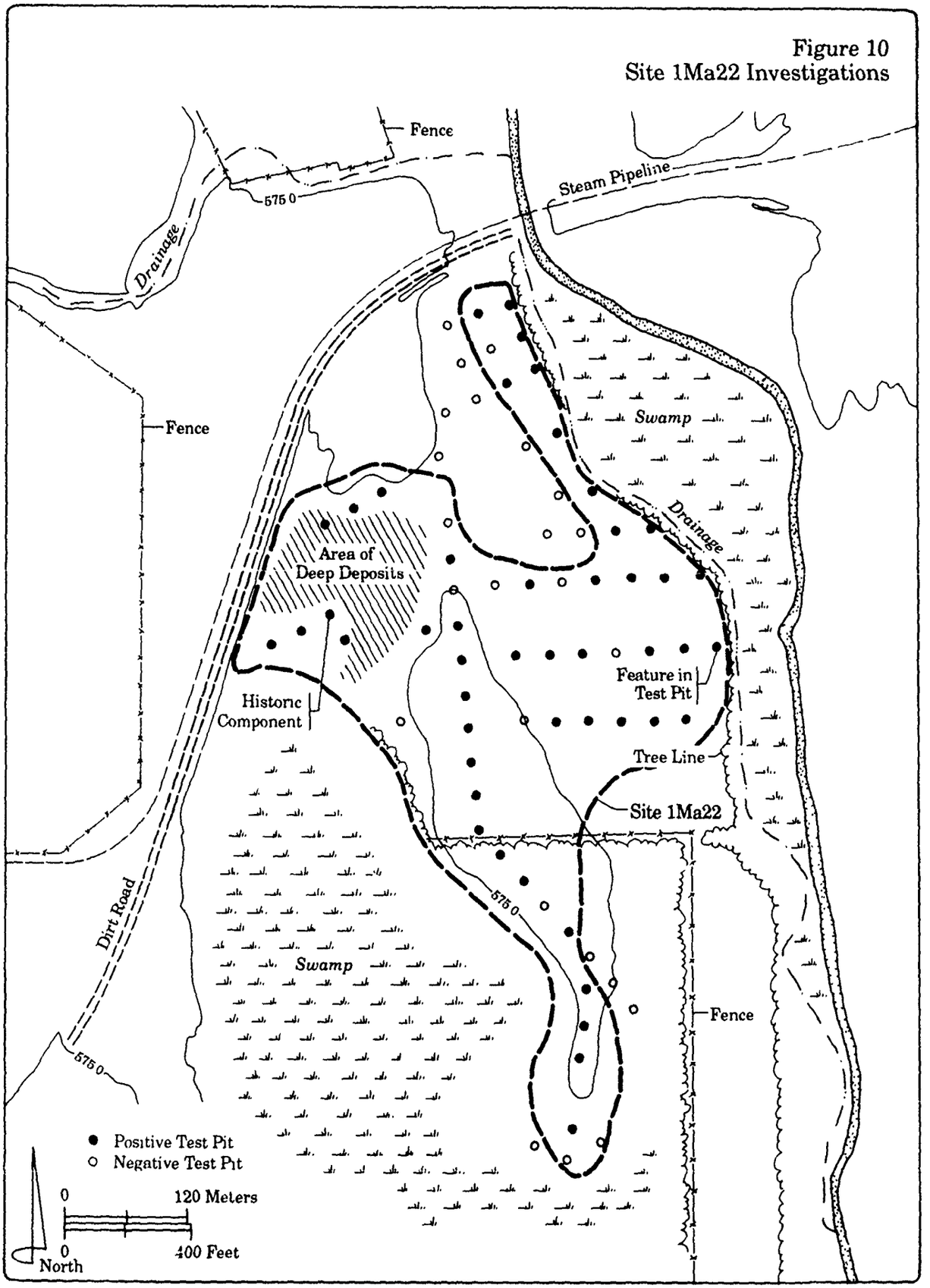


A. Site 1Ma22 view to the north. Site extends to the steam pipe in background and the McDonald Creek channel in the tree line.



B. Site 1Ma22 view to the north from top of ridge. Shovel testing at 98 feet (30 meter) intervals.

Figure 10
Site 1Ma22 Investigations



inches), this feature consisted of a dark brown soil layer approximately 10 centimeters (4 inches) thick. Additional shovel test pits excavated in the area failed to record the dark brown soil layer. The investigation of the ridge crest traversing the central portion of the site revealed a 10 to 25 centimeter (4 to 10 inch) thick reddish brown clayey loam plow zone covering red clay subsoil. While the ridge crest appears to be severely deflated by erosion, a thin dark soil horizon (possibly the remnants of a cultural midden) was observed eroding out of a shallow embankment running north/south parallel to the ridge. This embankment is located along an old fence line approximately 40 meters (44 yards) east of the ridge crest. A surface collection of the embankment and adjacent cow path resulted in the recovery of numerous pieces of lithic debitage and several biface fragments.

As noted above, Site 1Ma22 contains both prehistoric and historic period components. The prehistoric artifact collection recovered at Site 1Ma22 consists of 10 primary flakes, 62 secondary flakes, 30 interior flakes, 217 thinning flakes, 52 broken and unidentifiable flake fragments, 21 pieces of shatter/chunks, 5 flake tools, 3 cores, 3 bifaces, and 12 projectile points or projectile point fragments. Diagnostic points in this collection include several Archaic Period base fragments, 2 Early Archaic Damron points, a Larma rounded base point, and a fragment of what appears to be a Woodland or post-Woodland Period triangular point. A small collection of historic period artifacts recovered at Site 1Ma22 include plain cream-colored ceramics (n=1), amethyst-colored bottle glass (n=1), and molded clear bottle glass (n=2). The majority of these artifacts were discovered on the site's surface and were included within the general surface collection. They suggest a late nineteenth- or early twentieth-century occupation.

The varieties of projectile point styles and debitage recovered by the present survey suggest a wide range of prehistoric activities encompassing both the Archaic and Woodland cultural periods. Also, the association of site 1Ma22 to the McDonald Creek swamp raises questions concerning the occupational history, hunter-gatherer subsistence-settlement strategies, and the relative permanence of occupations near swamps. The higher elevation of the ridge may have served as an added enticement for occupations spanning longer periods of time and/or larger aggregations of people. During the Early and Middle Archaic Period, when populations were more mobile, this area may have been used as a base camp location that might evidence signs of seasonal sedentism. The prehistoric components of the site appear to have research potential, as indicated by the recovery of an intact cultural feature during the shovel test operations. These components are thus recommended as potentially eligible to the National Register of Historic Places. The historic components, however, are more restricted in location and appear to have suffered from previous disturbances, and these remains are not recommended as eligible. The site should receive further testing for final determinations of eligibility if future construction threatens these remains.

Site 1Ma111

This site represents a diffuse lithic scatter located on a ridge overlooking the west bank of McDonald Creek swamp. Located along a power line right-of-way, the site is bounded to the west by a large borrow pit and to the north and east by a small intermittent stream (Figure 11). The power line right-of-way was recently plowed and seeded with grass, allowing minimal ground surface visibility except in the two track access road. Shovel test units excavated west of this road yielded cultural materials to a depth of 30 centimeters (12 inches). The soil encountered in these shovel tests was a loose reddish clayey loam. To the east of the road and in the tree-line, three shovel test pit transects failed to recover any evidence of cultural occupation. Besides the data gathered by the shovel tests, a surface collection of the two track road yielded artifacts dispersed over a distance of 84 meters (92 yards). Artifacts recovered by both the shovel test pit operation and the surface collection of the two track road include 4 secondary flakes, 1 interior flake, 8 thinning flakes, 2 pieces of shatter/chunks, and 3 historic period shell cartridges. Five of the flakes were recovered from surface contexts. The small size of this site in addition to its low artifact density and highly disturbed context indicates a low potential for the future recovery of significant data at this location. Therefore site 1Ma111 is not considered significant and no further work is recommended.

Site 1Ma112

This site represents both a prehistoric and historic period artifact scatter situated on a high ridge overlooking the west bank of McDonald Creek swamp. The site is located southeast of Site 1Ma111 within the same power line right-of-way (Figure 11). Prehistoric artifacts were surface collected along the two track road beginning at the southern end of the ridge and extending northward 200 meters (219 yards) (Figure 12A). The densest concentration of artifacts occurred at the southern end of the ridge, where the ridge crest abruptly ends and slopes into the swamp. Both the east and west side of the power line cut were shovel tested in this vicinity and yielded positive results. Within the tree line east of the right-of-way, shovel test pits yielded cultural materials within a shallow reddish brown loam soil matrix which represents the plow zone. A red clay subsoil was beneath the plow zone, at a depth of 15 to 25 centimeters (6 to 10 inches). Prehistoric artifacts recovered by both the shovel test pit operation and the surface collection of the two track road include 2 primary flakes, 33 secondary flakes, 20 interior flakes, 50 thinning flakes, 26 broken or unidentifiable flakes, 7 pieces of shatter/chunks, and 2 cores.

While shovel testing in the woods, a historic occupation was identified in the northern region of the site. Although vegetation has overgrown many of the surface features, the archeological remains of a domestic structure with two chimneys (Figure 12B) and several outbuildings are still visible. The domestic structure measured approximately 10 by 5 meters (32 feet long and 16 feet wide). Shovel test pits placed adjacent to these chimneys yielded ceramic, glass, and metal artifacts. The area surrounding the domestic structure shows evidence of

Figure 11
Sites 1Ma111 and 1Ma112 Investigations

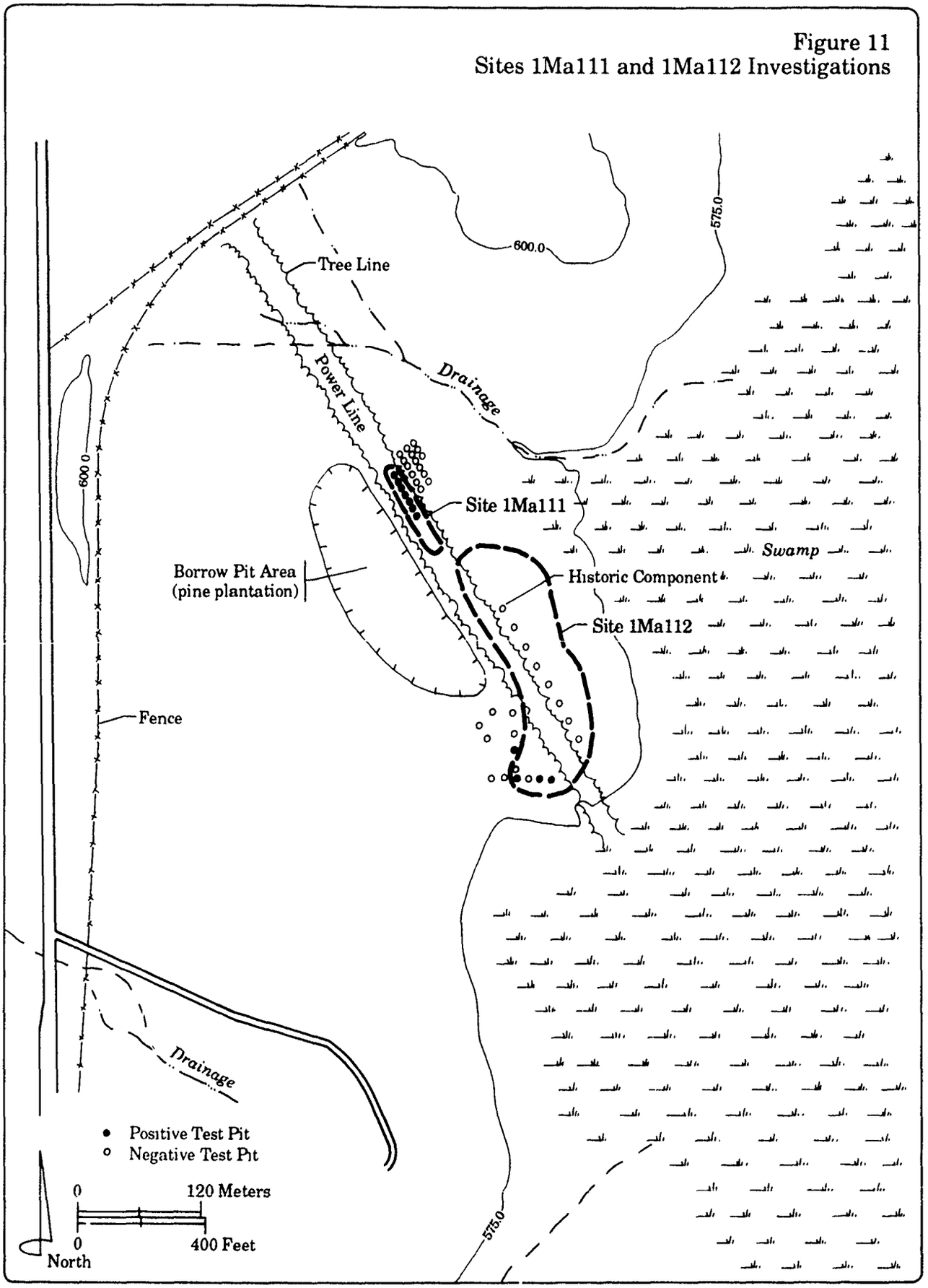
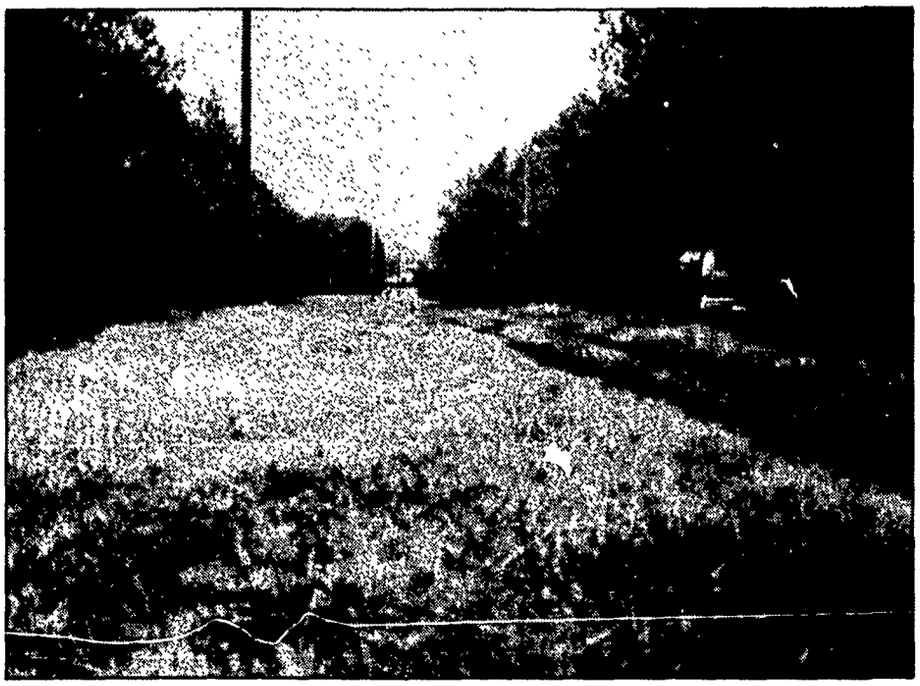


Figure 12
Site 1Ma112



A. Site 1Ma112 located along transmission line corridor and in the woods to the right of the picture. View to northwest.

B. Chimney remains at Site 1Ma112.

landscaping, with a fieldstone walkway and numerous ornamental plants. Historic artifacts recovered near the structural remains include plate glass (n=2), plain cream colored ceramic sherds (n=6), amethyst bottle glass (n=1), molded clear bottle glass (n=43), light green molded glass (n=2), wire nails (n=1), square nails (n=1), and a harness buckle. These artifacts are indicative of a turn-of-the-century occupation.

The variety of debitage classes represented at this site suggests that a wide range of prehistoric activities, from raw material procurement to stone tool production occurred at this location. Site preservation for the prehistoric components is uncertain. The historic component, at least in the area surrounding the chimney falls, would appear to be well-preserved, and the area of the structure has apparently not been plowed since at least the late nineteenth century. Testing is thus recommended for the area of the site encompassing the historic component, since the preservation of both prehistoric and historic materials may be greatest in this area. Such testing should be accomplished through the excavation of formal test units in tandem with archival research. Areas beyond this historic house site are not considered to represent potentially significant resources, since they have been subjected to more intensive and long term plowing and disturbance.

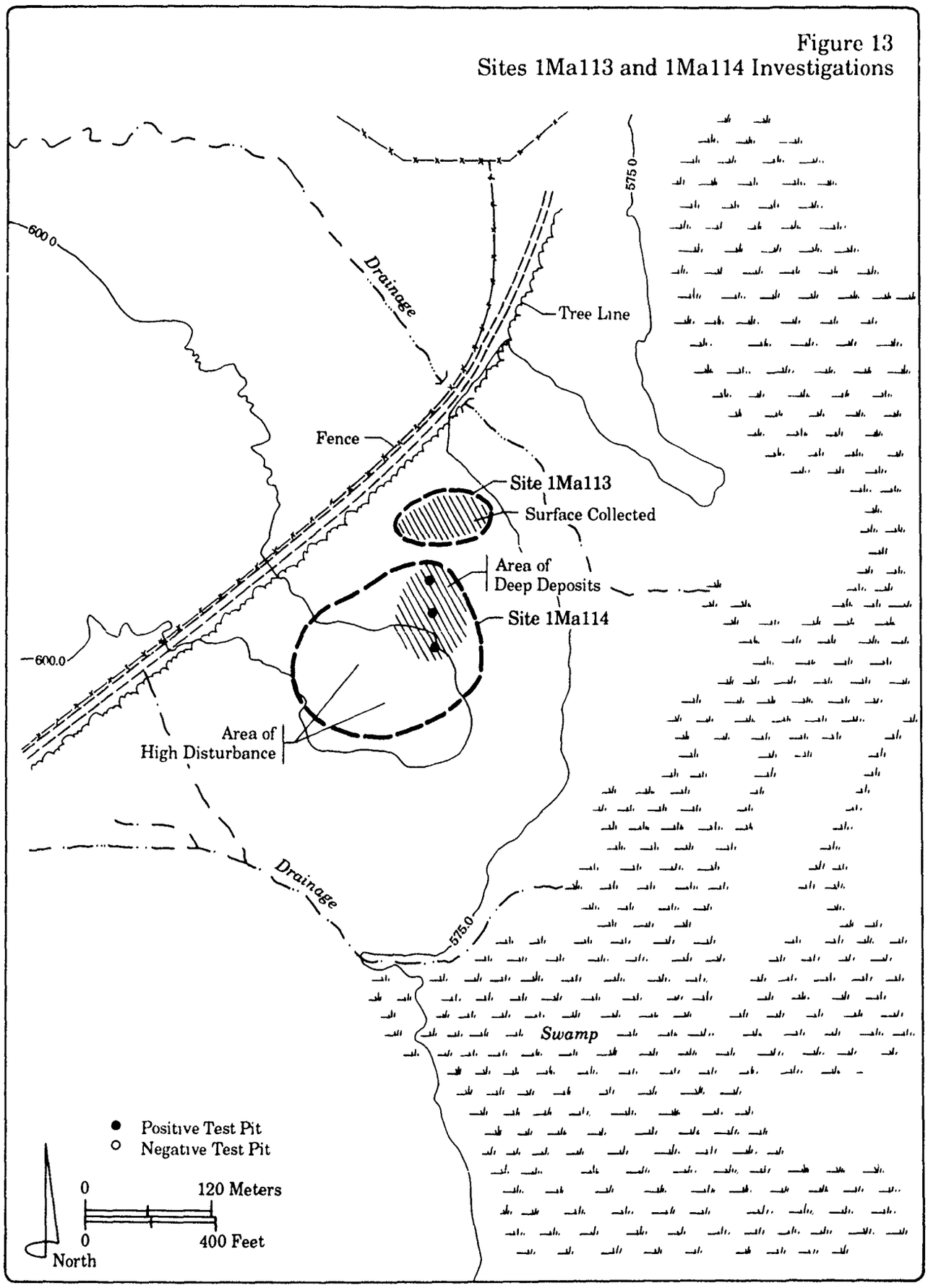
Site 1Ma113

This site represents a diffuse lithic scatter located on the side slope of an upland ridge overlooking a small intermittent drainage (Figure 13). Field work at this site consisted of a surface collection of the severely eroded slope and a recently seeded field. Site size based on this surface collection is estimated to be approximately 46 meters long by 91 meters wide (50 by 100 yards). Artifacts recovered during the field work include 1 primary flake, 1 secondary flake, 3 interior flakes, and 2 flake tools. The small size of this site, in addition to its low artifact density and highly disturbed context, indicates a low potential for the recovery of culturally diagnostic materials useful in assigning an occupation time span. Furthermore, the location of this site on a side slope suggests a brief or short term occupation where evidence of habitation is unlikely. Therefore site 1Ma113 is not considered significant and no further work is recommended.

Site 1Ma114

This site represents a diffuse lithic scatter covering an area 140 by 167 meters (150 by 183 yards) of a large ridge and its adjacent slopes (Figure 13). Recorded originally by Alexander (1979), the site was arbitrarily divided into separate regions called Areas A and B. Area A included the top of the ridge while Area B consisted of a historic roadbed located to the west of Area A. In addition to the roadbed (Area B), a more recent road bisects the site. South of this road, an agricultural field is situated where most of the prehistoric artifacts found during the original survey were recovered. Alexander (1979:76) also noted the presence of

Figure 13
Sites 1Ma113 and 1Ma114 Investigations



a historic component on this site, although he was not able to characterize its function:

> The historic occupation of the site consists of scattered sherds and metal fragments. It is possible that a historic house once occupied the area although it was not located during this survey. An alternative explanation of the abundance of historical material would be the association of the old roadway which crosses through the site.

The results of the present survey provides little new information concerning the historic occupation of site 1Ma114. Additional artifacts were collected from the old roadbeds crossing the site, but no architectural details were observed in the surrounding areas. This is not surprising given the degree of surface disturbance in this region. Presently, a large portion of the ridge crest serves as a training and bivouac area for the troops stationed at the arsenal. The agricultural field reported by Alexander is also heavily overgrown now, but the remnants of the old terraces are clearly visible. Shovel test pits placed in this field yielded no evidence of cultural occupation. While the surface inspection and shovel test units placed in the northern and western portions of the site indicate severe disturbances, test pits placed in the southeastern portion of site yielded evidence of deeper deposits. In this area, shovel test pits (n=3) encountered prehistoric materials in a dark brown loam matrix which extended 50 centimeters (20 inches) below the present ground surface.

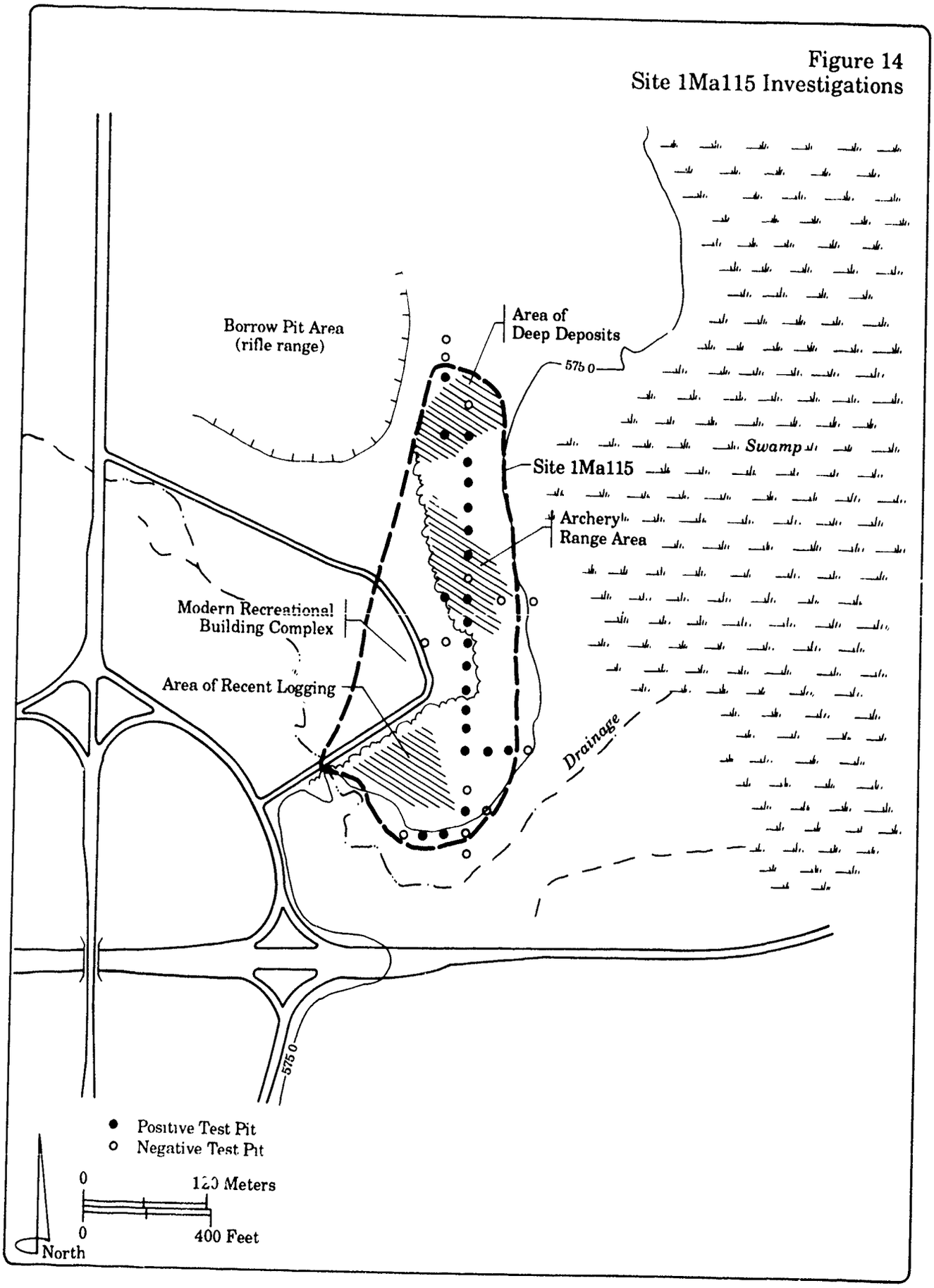
Artifacts recovered from surface collections and shovel test pits at this site include 1 primary flake, 4 secondary flakes, 2 interior flakes, 7 thinning flakes, 4 broken or unidentifiable flakes, 2 alkaline glazed stoneware sherds, 2 plain cream colored sherds, and 1 piece of amethyst colored bottle glass. The depth at which cultural materials were recovered along the eastern and southeastern boundary of the site suggest that intact, buried cultural deposits may exist in this region. For this reason, the site was recommended as potentially eligible to the National Register of Historic Places in the May 30, 1991 draft version of this report.

Site 1Ma114 was tested by the Mobile Corps of Engineers subsequent to the submission of the draft report. This testing revealed that the site lacked sufficient subsurface integrity to be recognized as a significant resource, and the testing report thus concluded that 1Ma114 was not eligible to the National Register. Given this assessment, no further work is called for at this site.

Site 1Ma115

This site represents a large lithic scatter situated on a ridge top and its adjacent slopes overlooking the west bank of McDonald Creek swamp (Figure 14). Site size is estimated to be 434 by 137 meters (475 by 150 yards). Surface collections made in small eroded areas surrounding the structures comprising the modern recreational complex indicate that the site once extended over the full width of the ridge. Other disturbances noted at this site included an archery range, rifle

Figure 14
Site 1Ma115 Investigations



range, and logging activities. The north end of the site has been impacted by the rifle range, where large borrow pits have destroyed the northwest corner of the site. In the extreme northeast corner of the site, however, shovel test pits revealed a reddish brown clayey loam soil overlying a red clay subsoil at depths ranging from 30 to 50 centimeters (12 to 20 inches) in an area approximately 60 by 70 meters (198 by 231 feet). To the east of the recreational complex in the archery range, shovel test pits revealed shallow soil deposits containing both historic and prehistoric artifacts in an area measuring 120 by 45 meters (396 by 148.5 feet). The soils in this region consisted of a reddish brown clayey loam, 10 to 20 centimeters (4 to 8 inches) thick, overlying red clay subsoil. South of the recreational complex, the site area has been partially disturbed by recent logging activity. Within this area, a surface collection was made in a small area used for processing logs as well as two logging roads that traversed the southern slope of the ridge. Shovel testing was also conducted in this portion of the site, yielding a lesser quantity of non-diagnostic prehistoric artifacts.

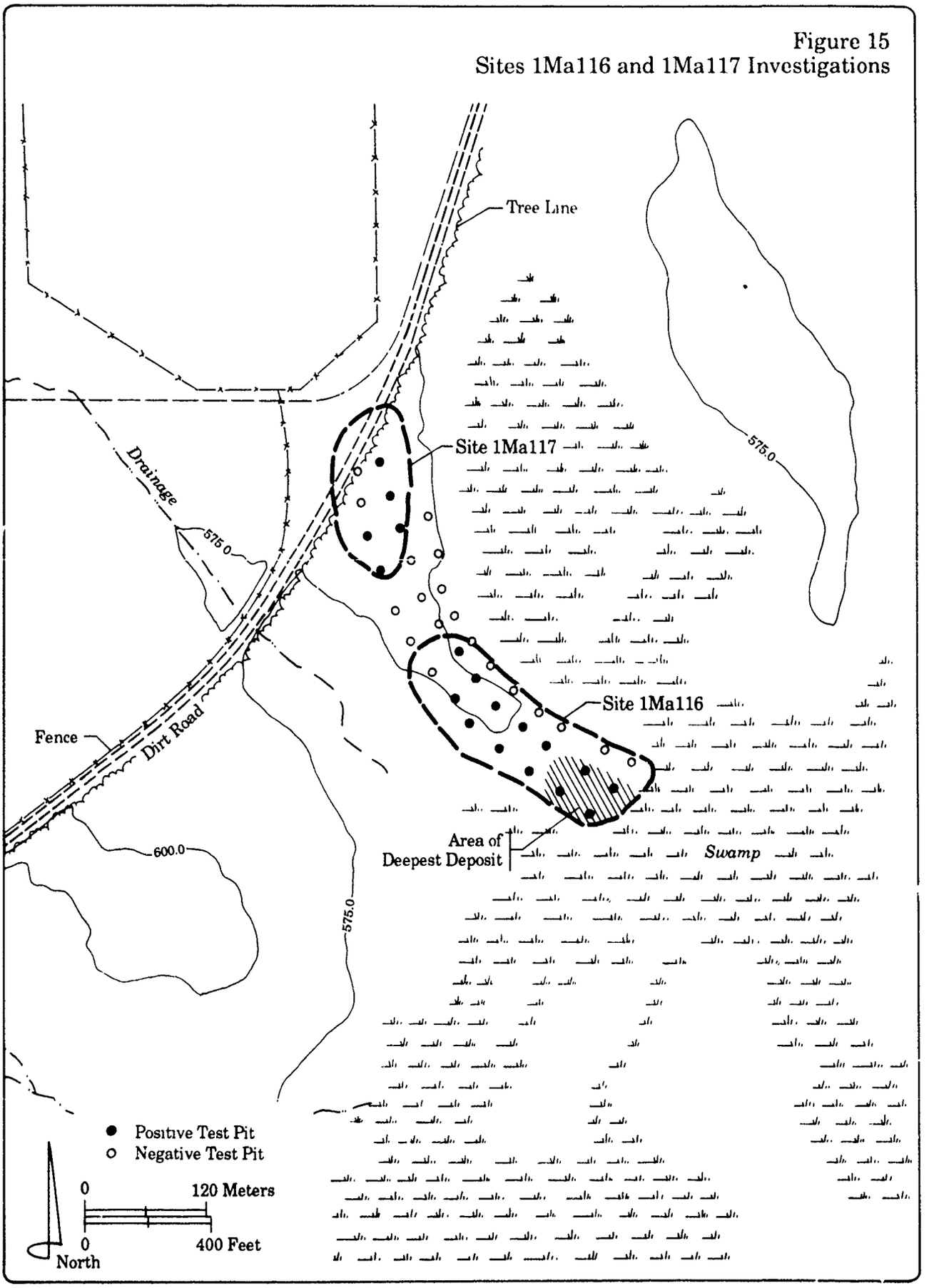
Artifacts recovered by surface collection and shovel test pits include 4 primary flakes, 71 secondary flakes, 6 interior flakes, 103 thinning flakes, 276 broken or unidentifiable flakes, 14 pieces of shatter/chunks, 1 flake tool, 2 cores, 6 bifaces, 2 projectile point tips, and 4 pieces of glass. These remains suggest a prehistoric occupation focused primarily on the Archaic Period, with a possible historic visitation which may simply be reflective of modern use. The intensity of various modern activities appears to have severely compromised site integrity in certain areas. While some integrity may yet exist in the northern-most portion of the site, the site as a whole is considered too badly disturbed to yield significant scientific data, and hence no further study or treatment is recommended for this site.

Site 1Ma116

This site represents a lithic scatter covering the ridge crest, slope, and terrace along the west bank of McDonald Creek swamp (Figure 15). Data recovered by shovel test transects beginning at the swamp edge and extending northward along the slope and ridge crest indicate the site encompasses an area 244 by 76 meters (267 by 83 yards) in size. The densest concentration of artifacts, however, were recovered in the southern portion of the site near the swamp. The soils encountered on the ridge crest were eroded, with only 10 to 20 centimeters (4 to 8 inches) of plow zone remaining. At the lower elevations near the southern edge of the site, soil deposits continued to greater depths. Presently, the site is overgrown with scrub vegetation suggesting recent clear cutting activities.

Artifacts recovered by the shovel test pit operation at this site include 6 secondary flakes, 6 interior flakes, 34 thinning flakes, 8 broken or unidentifiable flakes, and 2 pieces of shatter/chunks. As with site 1Ma115, this site appears to date to the general Archaic Period, with the absence of temporally diagnostic artifacts precluding more definitive cultural assignment. Also, as with 1Ma115, much of this site appears to have been disturbed by prior erosion. While some

Figure 15
Sites 1Ma116 and 1Ma117 Investigations



potential for intact deposits may exist along the southern edge of the site, its general degree of disturbance, relative paucity of artifacts, and lack of culturally diagnostic materials are all considered to remove this site from consideration for further study. The site is thus recommended as ineligible to the National Register of Historic Places, and no further study or treatment is called for.

Site 1Ma117

This site represents a small, diffuse lithic scatter situated on the same ridge crest as site 1Ma116 (Figure 15). A power line right-of-way and old railroad bed traverse the central and northern portions of the site, which has resulted in severe erosion of the area. The southern portion of site 1Ma117 is presently covered with scrub vegetation. Surface collections made in the northern and central portions of the site indicate that the site boundaries encompass an area 150 by 75 meters (164 by 82 yards) in size. Shovel testing on the southern end of the site revealed a 30 centimeter (12 inch) thick reddish brown clayey loam overlying red clay subsoil.

Artifacts recovered by both the shovel test operation and surface collection of eroded areas include 1 primary flake, 3 secondary flakes, 5 interior flakes, 7 thinning flakes, 1 broken or unidentifiable flake, 1 flake tool, and 1 projectile point tip. Site 1Ma117 has been severely disturbed by pipe line, power line, road, and railroad construction and therefore exhibits little site integrity. Also, due to the small site size and the low quantity of artifacts, it is doubtful that this resource can contribute new and important information concerning the occupation span or functional use of the area. Therefore, no additional work or treatment is recommended at site 1Ma117.

Site 1Ma447 (RA#1)

This site, located along the foot-slope of Madkin Mountain near the intersection of Burose and Neal Roads, consists of both a prehistoric lithic and historic artifact scatter (Figure 16). Presently, most of the site area lies in pasture, with only a small portion occurring in a stand of trees along a small drainage (Figure 17A). In the wooded area near a naturally occurring spring, the remains of a fieldstone chimney (Figure 17B) were found, indicating the presence of a historic period occupation of the site. Surface collections and shovel test pits in the immediate vicinity of the historic remains yielded amber (n=1), aqua (n=2), clear (n=8), and green (n=2) mold made bottle glass; plate glass (n=4); cream colored ceramics (n=3), alkaline glazed stoneware sherds (n=2), salt glazed stoneware sherds (n=1), cut nails (n=3), wire nails (n=1), mortar (n=6), and a hob-skirted Coke bottle fragment indicative of an early nineteenth through early twentieth century occupation.

Conversely, shovel test pits excavated in the pasture field yielded evidence of the prehistoric occupation only. Soils in this area consisted of a thin plow zone

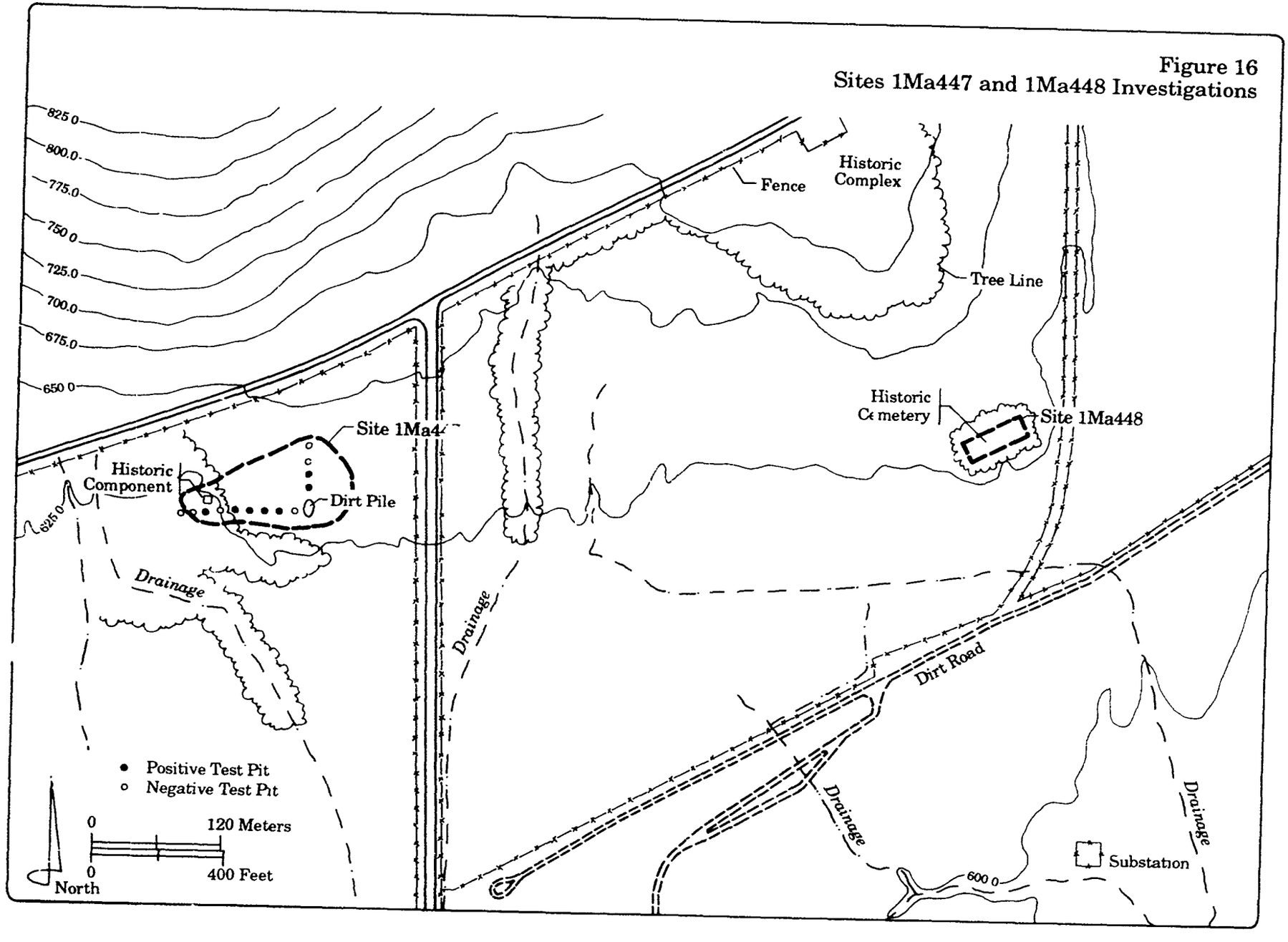


Figure 16
Sites 1Ma447 and 1Ma448 Investigations

Figure 17
Site 1Ma447

A. View looking to the west. Prehistoric component in the pasture field in foreground. Historic component along western edge of field and in the tree line.

B. Chimney remains, view looking to the north.

overlying red clay subsoil at a depth ranging from 10 to 20 centimeters (4 to 8 inches). Information derived from the shovel test pits and surface collections indicate the site covers an area measuring 76 by 153 meters (83 by 167 yards). Prehistoric artifacts recovered at this site include 8 secondary flakes, 7 interior flakes, 13 thinning flakes, 4 broken or unidentifiable flakes, 3 pieces of shatter/chunks, and 3 bifaces.

This site's location along the toe-slope of Madkin Mountain makes it an ideal location for the procurement of lithic materials that have eroded down the mountain slope. However due to the slope of the terrain surrounding the site, erosion has removed much of its soil. It is doubtful that such terrain would have served as a locus of long term occupation that could have resulted in the construction of storage features or other facilities important in the study of the region's prehistory. Therefore the prehistoric component of this site is judged to contain little significance and no further work is recommended. No additional work is recommended on the historic site, due to its erosional disturbance.

Site 1Ma448 (RA#2)

This site represents a historic period cemetery situated along the foot-slope of Madkin Mountain (Figure 16). Presently, the site is located in a stand of trees within a large pasture. A metal fence surrounds the site, which measures 60 meters long by 17 meters wide (200 by 55 feet). Headstones are not present on any of the graves, although numerous grave depressions are visible. This site is believed to be associated with the historic complex that once existed several hundred yards to the north. This complex, although outside of the present project area, was inspected and found to contain several large foundations and a brick lined well. Any future construction plans that impact this site must adhere to both state and Federal laws pertaining to the relocation of human remains.

Site 1Ma449 (RA#4)

This site represents a sparse lithic scatter situated on a bottom land knoll between McDonald Creek swamp and the McDonald Creek channel (Figure 18). The knoll is bounded to the north and south by drainage swales that are subject to water impoundment during times of excessive rain. Presently the site is in pasture, although a cow path running through the center of the site did allow for a small surface collection. Systematically placed shovel test pits on the knoll yielded a soil profile consisting of a brown clayey loam plow zone overlying a yellow clay subsoil at a depth of approximately 20 centimeters (8 inches). Artifacts collected by the shovel test operation and surface collection of the cow path include 7 secondary flakes, 7 interior flakes, 25 thinning flakes, 4 broken or unidentifiable flakes, 2 pieces of shatter/chunks, 1 bifacial tool, and 1 broken midsection of a projectile point. The size of Site 1Ma449 is estimated to be 183 meters long by 60 meters wide (200 by 65 yards). Although the plow zone at this site appears fairly shallow, the shovel test operations did not yield any evidence to suggest the

presence of intact buried horizons, nor were culturally diagnostic artifacts recovered which would make collections from the plow-zone of scientific value. It is thus recommended that site 1Ma449 not be considered as eligible to the National Register of Historic Places, and therefore that no further study or treatment be afforded to this site.

Site 1Ma450 (RA#5)

This site represents a small, diffuse lithic scatter situated on a bottom land knoll between the McDonald Creek swamp and the McDonald Creek channel (Figure 18). The site is located approximately 50 meters (55 yards) south of site 1Ma449. The knoll on which site 1Ma450 rests is bounded both to the north and south by drainage swales that are subject to ponding water during times of excessive rain. Presently the site is in pasture. Systematically placed shovel test pits on the knoll yielded a soil profile consisting of a brown clayey loam plow zone soil overlying yellow clay subsoil at a depth of approximately 30 centimeters (12 inches). The size of site 1Ma450 is 76 meters (83 yards) in diameter.

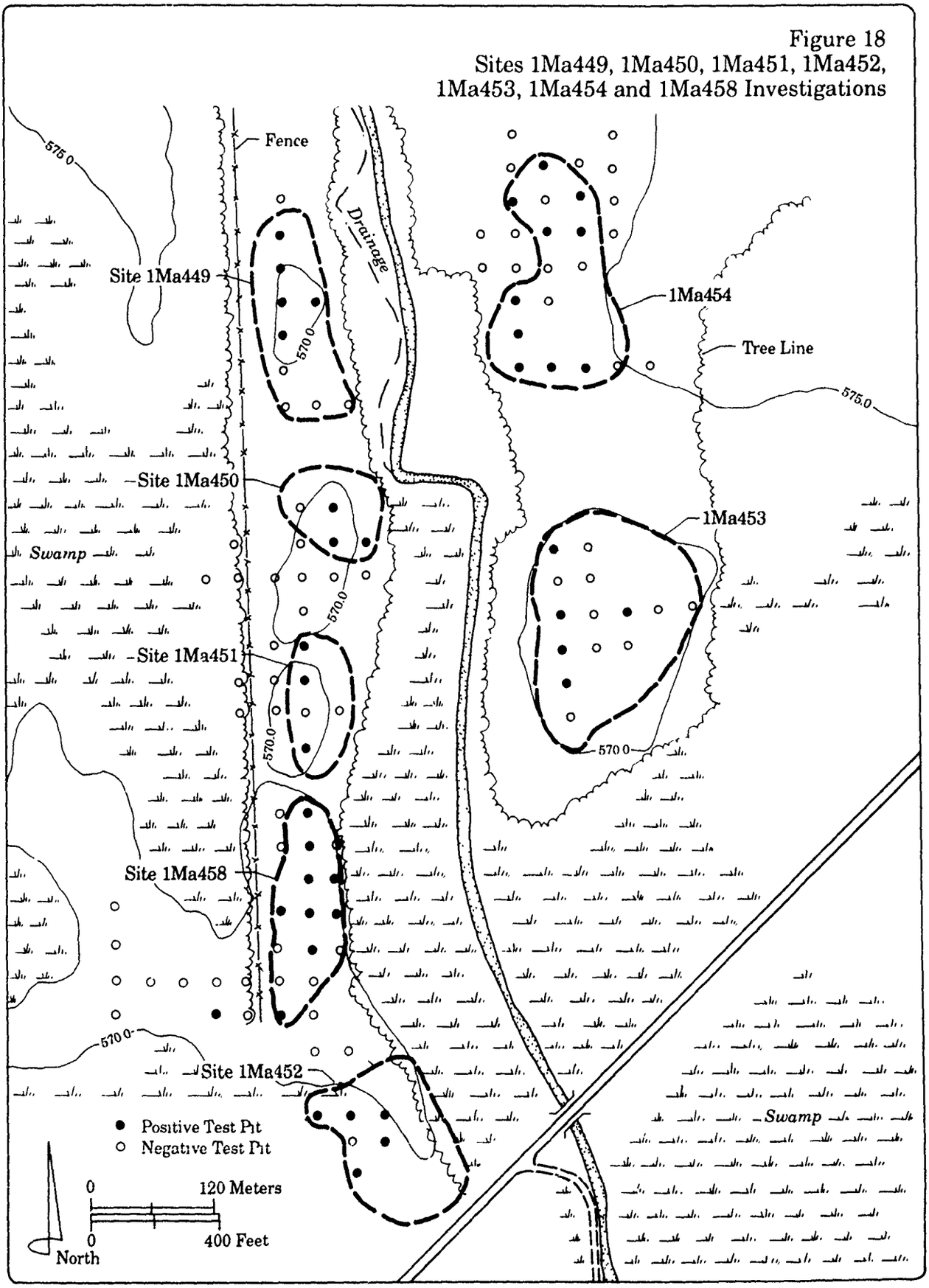
Artifacts recovered from site 1Ma450 include 1 secondary flake, 4 thinning flakes, and 2 pieces of shatter/chunks. Although the quantity of artifacts recovered from this location was less than that stipulated in New South Associates' research design as constituting a site, a site designation was applied to this location given its physiographic setting and artifact content. No diagnostic material was recovered from the site, and the presence of this sparse scatter of materials within plow zone contexts indicates that this site does not possess additional research value. The site is therefore considered ineligible to the National Register of Historic Places, and no additional study or treatment of this site is recommended.

Site 1Ma451 (RA#6)

This site, situated on a bottom land knoll between the McDonald Creek swamp and the McDonald Creek channel, consists of a prehistoric lithic scatter (Figure 18). The site is located approximately 60 meters (66 yards) south of site 1Ma450. The knoll on which site 1Ma451 rests is bounded to the north by a small drainage and to the south by a drainage swale that is subject to water impoundment. Presently the site is in pasture. Systematically placed shovel test pits on the knoll yielded a soil profile consisting of a brown clayey loam plow zone overlying a yellow clay subsoil at a depth of approximately 15 centimeters (6 inches). In addition to the shovel test pits, a surface collection was made along the tree line following a small drainage on the north side of the site. The size of site 1Ma451 is 122 by 61 meters (133 by 67 yards).

Artifacts recovered by the shovel testing operation and the surface collection of the tree-line include 2 secondary flakes, 2 interior flakes, 4 thinning flakes, and 4 broken or unidentifiable flakes. The small quantity of artifacts recovered by the field work procedures suggest that additional work would yield little new

Figure 18
Sites 1Ma449, 1Ma450, 1Ma451, 1Ma452,
1Ma453, 1Ma454 and 1Ma458 Investigations



information pertaining to the occupational history of the site. Furthermore, since this site appears to be only briefly occupied, it is unlikely to contain evidence of storage or other features. Therefore, it is recommended that no further work be undertaken at this site.

Site 1Ma452 (RA#7)

This site represents a lithic scatter situated on a bottom land knoll between the McDonald Creek swamp and the McDonald Creek channel (Figure 18). The site is located approximately 50 meters (55 yards) south of site 1Ma458. The knoll on which site 1Ma452 lies is bounded to the north by a drainage swale that is subject to water impoundment. To the south of the site is Martin Road. Presently the site is in pasture. Systematically placed shovel test pits on the knoll yielded a soil profile consisting of a brown clayey loam plow zone overlying a yellow clay subsoil at a depth of approximately 25 centimeters (10 inches). Two cow paths, one running north/south through the center of the site and one following the tree line along the site's eastern perimeter, were also surface collected. The size of site 1Ma452 is 155 meters long by 91 meters wide (170 by 100 yards).

Artifacts recovered by both the shovel testing and the surface collection operations include 2 primary flakes, 14 secondary flakes, 11 interior flakes, 22 thinning flakes, 7 broken or unidentifiable flakes, 4 pieces of shatter/chunks, 3 flake tools, 2 bifaces, and 2 projectile point fragments that are too fragmentary for cultural-historical identification. Site 1Ma452 thus appears to date to the Archaic Period, although further refinement of this site's cultural association is not possible based on the material recovered from the survey. While the density of materials at this site is greater than at other sites along McDonald Creek, shovel testing failed to identify any areas of subsurface preservation, and the absence of diagnostic materials limits the research value of the plow zone collections. Therefore, this site is not recommended as eligible to the National Register, and no further study or treatment of this site is required.

Site 1Ma453 (RA#8)

This site represents a lithic scatter located on level, well-drained bottom land overlooking the east bank of McDonald Creek (Figure 18). To the south of the site and adjacent to Martin Road is a low marshy area with standing water. Presently site 1Ma453 is located in a pasture field with a two track road running along its eastern perimeter. The site covers an area 198 meters long by 153 meters wide (217 by 167 yards). Shovel test pits dispersed across the site area yielded a soil profile consisting of reddish brown clayey loam plow zone overlying a reddish brown clay subsoil at a depth ranging from 15 to 20 centimeters (6 to 8 inches) below surface.

Artifacts recovered by the shovel test operation and surface collection of the two track road include 4 secondary flakes, 2 interior flakes, 6 thinning flakes, 1

broken or unidentifiable flake, 3 pieces of shatter/chunks, and 1 flake tool. As the plow zone appears to consist of weathered substrate, it appears that this site has been plowed into the subsoil for some time. The low density of materials, absence of cultural diagnostics, and lack of subsurface integrity all indicate that this site should not be considered as eligible to the National Register. Therefore no further treatment of this site is recommended.

Site 1Ma454 (RA#9)

This site represents a lithic scatter located approximately 150 meters (500 feet) north of site 1Ma453 on level, well-drained bottom land (Figure 18). Presently site 1Ma454 is located in a pasture with a two track farm road running along its eastern perimeter. The site area covers an area 198 meters long by 122 meters wide (217 by 133 yards). Shovel test pits dispersed across the site area revealed a soil profile consisting of a reddish brown clayey loam soil plow zone overlying a reddish brown clay subsoil at depths ranging from 15 to 25 centimeters (6 to 10 inches) below surface.

Artifacts recovered include 6 secondary flakes, 2 interior flakes, 23 thinning flakes, 3 broken or unidentifiable flakes, 2 pieces of shatter/chunks, 3 flake tools, and 1 bi-directional core. This site exhibits many of the same characteristics as site 1Ma453 and thus is also considered to be ineligible to the National Register. No further treatment of this site is recommended.

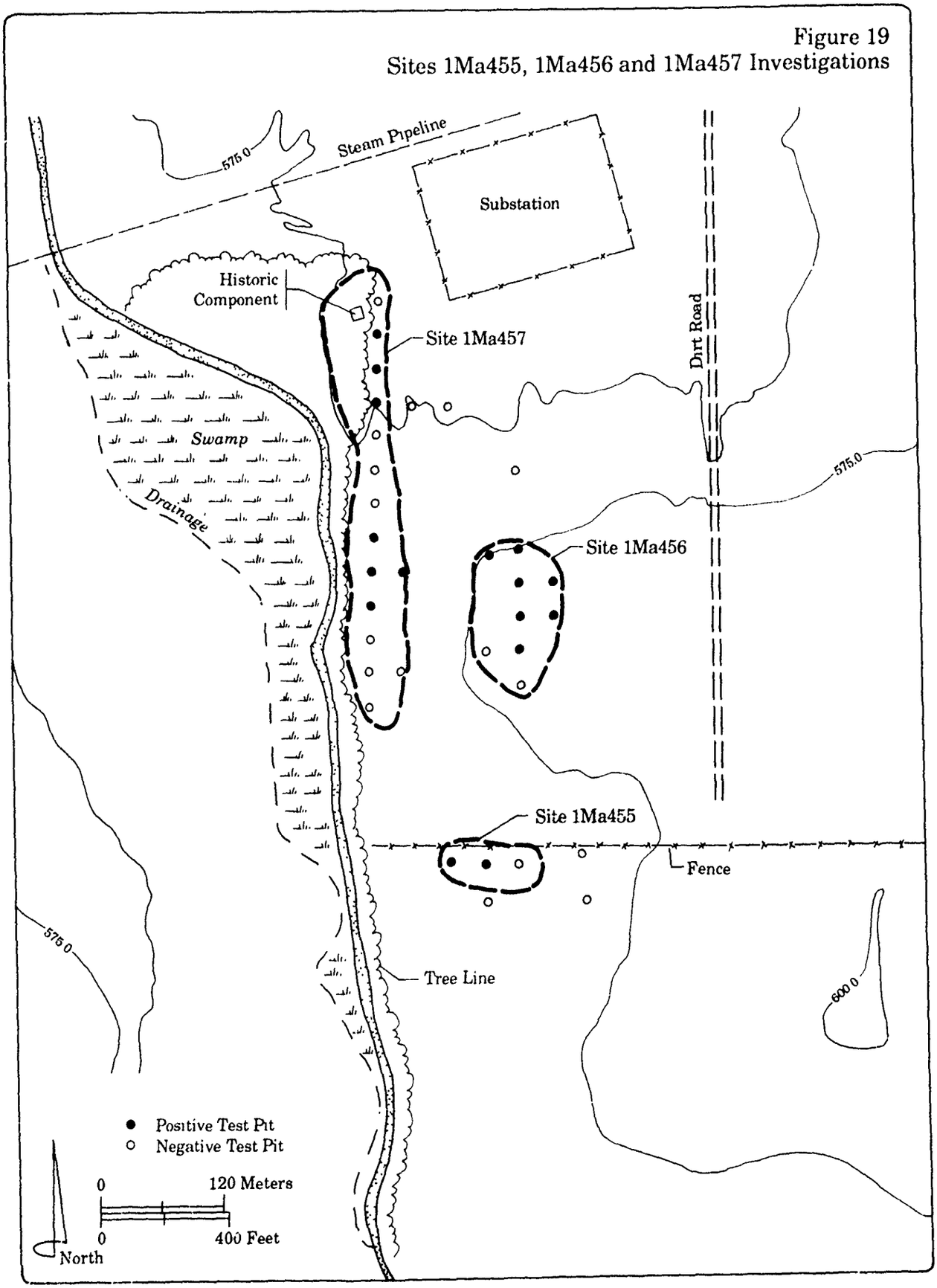
Site 1Ma455 (RA#10)

This site represents a historic artifact scatter associated with the archeological remains of historic structures. It is located on a low lying ridge that extends in a westward direction into the McDonald Creek bottom land (Figure 19). Presently the site serves as a cattle feed area, and given the depth of manure covering the ground surface, this activity has persisted over a considerable period of time. Shovel test pits excavated through the most recent organic deposit revealed a soil profile consisting of a brown clayey loam plow zone overlying a reddish brown clay subsoil at depths ranging from 20 to 25 centimeter (8 to 10 inches) below the original ground surface. Also noted at this site was a possible fieldstone chimney base. The site covers an area 46 meters long by 91 meters wide (50 by 100 yards). Due to the severity of the disturbances, this site is not considered significant and no further work is recommended at this location.

Site 1Ma456 (RA#11)

This site represents a lithic scatter located on an upland ridge crest overlooking the McDonald Creek bottom land (Figure 19). A cow path traverses a portion of this ridge and descends down its west facing slope. Artifacts were recovered from this path both along the top of the ridge and the upper slope (Figure 20A). Shovel test pits dispersed across the site area revealed a soil profile

Figure 19
Sites 1Ma455, 1Ma456 and 1Ma457 Investigations



consisting of a brown clay loam plow zone overlying a red clay subsoil at depths ranging from 5 to 30 centimeters (2 to 12 inches) below ground surface. On top of the ridge crest, a disturbance was noted that appeared to be the result of attempted vandalism. Several pieces of prehistoric debitage were collected from the back-dirt of this disturbance. The site covers an area measuring 137 meters long by 91 meters wide (150 by 100 yards). Artifacts recovered during the present survey include 9 secondary flakes, 3 interior flakes, 25 thinning flakes, 3 broken or unidentifiable flakes, 8 pieces of shatter/chunks, 1 flake tool, 1 biface, and 1 broken projectile point fragment.

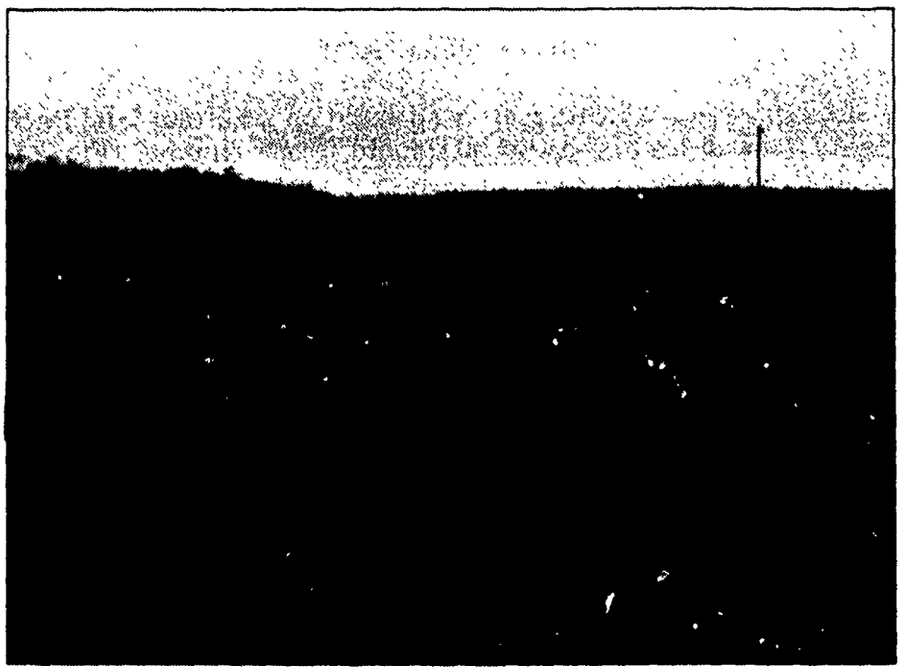
The location of this site on a high upland ridge offers a rather unique setting somewhat distant from the creek and swamp margin. However, shovel test excavations failed to reveal intact subsurface deposits at this site, and the absence of culturally diagnostic materials in the survey collection limits the research potential of the artifacts contained within the plow zone. The site is thus considered as ineligible to the National Register, and no further treatment of this site is recommended.

Site 1Ma457 (RA#12)

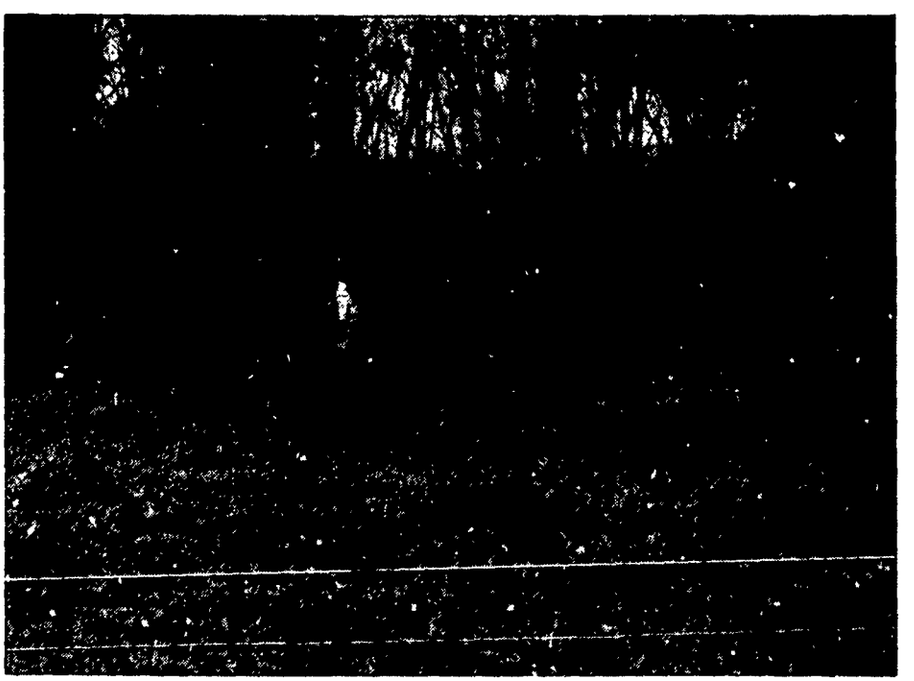
This site represents a long, narrow lithic scatter that parallels the east bank of McDonald Creek (Figure 19). Located on the level, well-drained bottom land, this site covers an area measuring 411 meters long by 61 meters wide (450 by 67 yards). Shovel test pits paralleling the creek channel and a recently constructed flood control embankment revealed a soil profile consisting of a reddish brown clayey loam plow zone overlying a a red clay subsoil at depths ranging from 5 to 20 centimeters (2 to 8 inches) below the surface. A recently constructed flood control embankment parallels the eastern flank of the creek channel (Figure 20B), suggesting that the western portion of this site may have been destroyed by a recent re-channelization project. Partial confirmation of this post-depositional disturbance was obtained by an examination of the flood control embankment, in which numerous artifacts were found eroding from its matrix. Also, at the north end of the site, the remains of a farmstead or tenant house were identified. In addition to structural remains, surface collection and shovel test pits yielded a number of historic artifacts including plate glass, wire nails, plain cream colored ceramics, molded bottle glass (various colors), and machine made bricks.

Artifacts recovered from the prehistoric component of the site included 4 primary flakes, 5 secondary flakes, 11 interior flakes, 19 thinning flakes, 9 broken or unidentifiable flakes, 4 pieces of shatter/chunks, 2 cores, 2 bifaces, and 1 broken projectile point fragment (unidentifiable). The size and density of the material scatter suggest that this location was a major locus of activity focusing on the broad bottom land of McDonald Creek. However, this site appears to have received considerable post-depositional impact, both from the construction of the flood control embankment and from apparent subsoil plowing, as indicated by the

Figure 20
Sites 1Ma456 and 1Ma457



A. Site 1Ma456 located along top of ridge in background. View to the east.



B. Site 1Ma457 cultural material recovered in break in flood control embankment. View to the west.

appearance of the plow zone soils. This factors, in tandem with the lack of culturally diagnostic artifacts, suggests that this site does not possess sufficient research value to warrant further study. It is therefore recommended that 1Ma457 be considered as ineligible to the National Register of Historic Places.

Site 1Ma458 (RA#13)

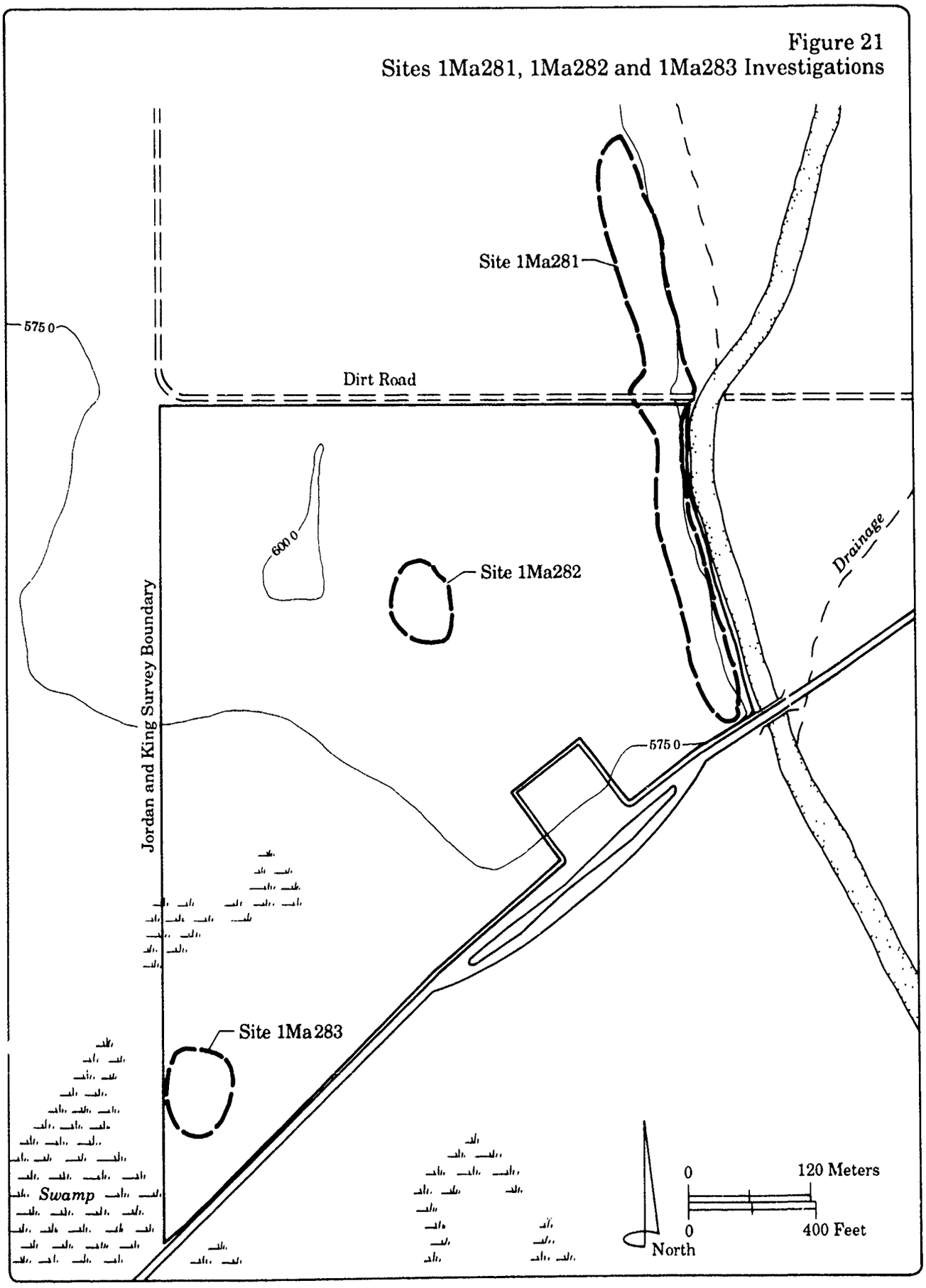
This site represents a lithic scatter situated on a bottom land knoll between the McDonald Creek swamp and the McDonald Creek channel (Figure 18). The knoll is bounded both to the north and south by drainage swales that are subject to water impoundment. Presently the site is in pasture. Systematically placed shovel test pits on the knoll yielded a soil profile consisting of a brown clayey loam plow zone overlying a yellow clay subsoil at a depth of approximately 25 centimeters (10 inches) below ground surface. The size of site 1Ma458 is 198 meters long by 61 meters wide (216 by 67 yards).

Artifacts recovered at site 1Ma458 include 2 primary flakes, 8 secondary flakes, 16 interior flakes, 38 thinning flakes, 9 broken or unidentifiable flakes, 8 pieces of shatter/chunks, 1 biface, and 2 broken projectile point bases (unidentifiable). As with other archaic scatter distributed along McDonald Creek, the site offers intriguing information regarding settlement and subsistence strategies, but does not appear to possess either the subsurface preservation or culturally diagnostic materials necessary to address such research themes beyond the level reached by simple site recordation. Therefore, site 1Ma458 is considered to be ineligible to the National Register, and no further work at this site is recommended.

Sites 1Ma281, 1Ma282, and 1Ma283

These sites were recorded during the Office of Archeological Research, Alabama State Museum of Natural History, survey of the proposed construction site for BMD Headquarters and associated earth borrow areas (Jordan and King 1985). As part of this survey, Jordan and King surveyed a 30.4 hectare (75 acre) parcel of land falling within the proposed Neal Road Extension Corridor and recorded three archeological sites (Figure 21). Two of the three sites (1Ma281, 1Ma283) are prehistoric sites, while the third site (1Ma282) is a post-1911 farm house. Because site 1Ma281 contained evidence of early aboriginal occupation, it was recommended for further testing; a recommendation that should be followed if impacted by the Neal Road Extension Corridor. No further work was recommended at sites 1Ma282 and 1Ma283.

Figure 21
Sites 1Ma281, 1Ma282 and 1Ma283 Investigations



V. CONCLUSIONS AND RECOMMENDATIONS

This chapter will discuss the objectives of this investigation and summarize the results of the field work activities. Also included in this chapter is a discussion of the approach adopted to evaluate site significance in accordance with National Register criteria and the project research design. Recommendations for further research are presented on a site by site basis.

CONCLUSIONS

The first objective of the present cultural resources investigation was a determination of whether the materials occurring at the proposed Dry Boat Storage Facility represented an extension of site 1Ma126 or a separate, discrete, cultural occupation. This objective was met through a program of systematically placed shovel test pits and controlled excavation units located both within the proposed facility site and the area separating the facility from site 1Ma126.

The results of the present investigation confirmed that the materials recovered from the proposed Dry Boat Storage Facility represent a southwestern extension of site 1Ma126. Shovel testing north of the proposed facility consistently yielded cultural materials along the full length of the terrace separating the two locations. Furthermore, information recovered from the controlled excavation units placed within the facility site indicates the presence of Early Archaic, Late Archaic, and Early Woodland components similar to those previously reported at site 1Ma126. Based on these results, the archeological manifestation located within the proposed Dry Boat Storage Facility was determined to be a southwestern extension of site 1Ma126, which has previously been determined to be eligible to the National Register of Historic Places.

The second objective of the present cultural resources investigation was an examination of the 834 acres of land within the Neal Road Extension Corridor to locate and evaluate all cultural resources within the proposed corridor. Excluded from the present survey was a 75 acre parcel of land surveyed by the Office of Archeological Research, Alabama State Museum of Natural History (Jordan and King 1985). The second objective was accomplished through a program of close-interval shovel testing in areas of high site potential, wider interval shovel testing in areas of low site potential, and pedestrian survey in areas severely disturbed by modern construction. The survey resulted in the recordation of 12 unknown or previously unrecorded sites and the relocation of 8 known or recorded sites. Of these sites, three are considered to represent potentially significant resources which may be eligible to the National Register of Historic Places.

One of the questions of particular interest to this study is why swamp-edge sites were advantageous to Archaic groups. In the present study area, Thomas et al. (1980) observed that sites in swamp environments seem to lack Woodland and

Mississippian components, while sites that are located closer to the Tennessee River contain Archaic through Mississippian occupations. Their findings were supported by the Redstone Arsenal survey results, although the absence of culturally diagnostic materials (either intact projectile points or ceramics) limits the identification of these site components beyond a generally recognized association with the Archaic Period.

Based on the survey results, it is hypothesized that Archaic groups inhabiting the study area located their camps in and around swamp environments in order to aid women in their dual roles as child-care providers and plant food collectors. Homogeneous environments such as the temperate forests of the eastern Highland Rim region are characterized by low species diversity and high species equability (MacArthur 1972). In environments such as these, the diversity of vascular flora as well as the overall high productivity of swamps, would have served as attractive locations for settlement by local hunter-gatherer groups. A study of Mingo pond, a marsh located in the eastern Highland Rim region of southern Tennessee, recorded a diversity of plant species dominated by *Dulichium arundinaceum,* with aquatic plants of *Polygonum* spp., *Myriophyllum tenellum,* and *Ceratophyllum demersum* present locally in pools, and with willow (*Salix*) and buttonbush shrubs occupying shallow areas in the basin (Delcourt 1979:258).

The more dominant tree species associated with Mingo pond's margin were water oak (*Quercus nigra*), willow oak (*Quercus phellos*), white oak (*Quercus alba*), red oak (*Quercus falcata*), post oak (*Quercus stellata*), ash (*Fraxinus caroliniana*), and red maple (*Acer rubrum*). Also included in this forest community were dogwood (*Cornus asperifolia*), sweetgum (*Liquidambar styraciflua*), walnut (*Juglans*), sycamore (*Platanus occidentalis*), beech (*Fagus grandifolia*), black gum (*Nyssa sylvatica*), and hickories (*Carya* spp.) (Delcourt 1979:258). Given the highly productive nature of this forest community, it is understandable why swamps were utilized by hunter-gatherers. Also, swamp margin camps would have allowed women easy access to a wide variety of economically important woody and herbaceous plant resources. This easy access would tend to minimize the energy that women expended on plant gathering forays, which would in turn enable them to use this "saved" energy in the care and nurturing of their children. It should be noted, however, that the materials recovered from the survey sites are generally indicative more of hunting activities than of gathering and plant processing. The archeological evidence of such gathering activities is still not clearly understood, and additional research attention should be focused on the tools necessary for procuring and processing swamp plant resources, and their archeological preservation potential.

Swamp environments in the project area are rich in edible and medicinal plants. Table 11 lists economically important plants that may have been utilized by Archaic groups. In order to elaborate upon the possible linkage between hunter-gatherers and swamp environments, and specifically upon the role which child-rearing may have played in such settlement decision, data was collected on child rearing (specifically the age of weaning and when new foods were

Table 11. Economically Important Swamp and Wetland Flora.

Common Name	Genus	Edible Structures	Medicinal	References
Arrowhead	*Sagitaria* sp.	tubers	yes	ABHE
Blueberry	*Gaylussacia* sp.	fruit	yes	CE
Buttercup	*Ranunculus* sp.	none	yes	EF
Calamus	*Acorus* sp.	leaves (greens)	yes	ABCE
Catbrier	*Smilax* sp.	leaves (greens), roots	yes	CE
Cattail	*Typha* sp.	flowers, pollen, roots, stems	yes	BCE
Chufa	*Cyperus* sp.	tubers	yes	CE
Dock	*Rumex* sp.	leaves (greens)	yes	CE
Elder	*Sambucus* sp.	berries (beverage), flowers	yes	CE
Great Bulrush	*Scirpus* sp	root (rich in starch and sugar)	yes	CE
Groundnut	*Apios* sp.	seed pods, tubers	no	CE
Hawthorn	*Crataegus* sp.	berries	yes	CE
Juneberry	*Amelanchier* sp.	berries	yes	CE
Knotweed	*Polygonum* sp.	leaves (greens), seeds	yes	CE
Lizard's Tail	*Saururus* sp.	none	yes	EF
Pigweed	*Amaranthus* sp.	leaves (greens), seeds (flour)	yes	CE
Pond Lily	*Nuphar* sp.	roots (potato subs.), seeds	yes	BCE
Pondweed	*Potamogeton* sp.	none	yes	DE
Rose	*Rosa* sp.	flowers, leaves (beverage)	yes	CE
Skunk Cabbage	*Symplocarpus* sp.	leaves, roots	yes	BE
Violet	*Viola* sp.	flowers, leaves (greens)	yes	CE
Tuckahoe	*Peltandra* sp.	roots	yes	ABE
Water Eryngo	*Eryngium* sp.	none	yes	E
Water Hemlock	*Cicuta* sp.	none	yes	E
Water Lily	*Nymphaea* sp.	roots	yes	BEF
Water Plantain	*Alisima* sp.	none	yes	DE

References: A. Davenport and Haynes 1981; B. Elliot 1976; C. Hall 1976; D. Haynes 1980; E. Moerman 1986; F. Wiersema and Haynes 1983.

Note: The native habitats of each plant were checked in Godfrey and Wooten 1979 and Godfrey and Wooten 1981.

introduced) and women's contribution to subsistence for a sample of fifteen modern hunter-gatherer groups from the Standard Cross Cultural Sample of 186 societies (Barry and Schlegel 1980). Ethnographically recorded societies were selected based on their subsistence systems (those practicing no agriculture or animal husbandry), their mobility strategies (fully nomadic, semi-nomadic, or semi-sedentary), their maximum community size (less than 200 people), and their degree of social complexity (see Murdock and Morrow 1980, Murdock and Provost 1980, Murdock and Wilson 1980, Tuden and Marshall 1980). This selection process yielded the fifteen groups that are listed in Tables 12 and 13. Table 12 presents data on when children are weaned by these groups (abstracted from Barry and Paxson 1980) and Table 13 presents information on women's contributions to hunter-gatherer subsistence (abstracted from Barry and Schlegel 1982).

These data suggest that women in hunter-gatherer societies make significant subsistence contributions and are probably nursing children for most of their adult lives. The average female contribution to subsistence among these fifteen groups ranges from 0 percent to 65 percent of the overall diet, with the mean being 24 percent. The primary dietary contribution of women in these fifteen groups is the gathering of plant foods. Women foragers collect from 25 percent to 100 percent of the plant foods. These data suggest that in most cases men collect a greater percentage of the food that is consumed, however, the overwhelming importance of women in the gathering of floral resources cannot be underestimated.

The data presented in Table 12 suggest that women in many hunter-gatherer groups wean their children late. Ten of the thirteen groups wean their children after two years, with the age of weaning ranging from 24 to 72 months. Late weaning has a whole array of potential benefits for hunter-gatherer women. First and foremost, continuous lactation in women is directly linked to suppressing their fertility (Jones 1986, Lancaster and Lancaster 1987, Lancaster 1989). This is beneficial to hunter-gatherer women because it enables them to control the length of time that passes between births. Research suggests that the ideal birth spacing for hunter-gatherers is four years (Jones 1986, Lancaster and Lancaster 1987). This interval enables women to keep the transport costs of their dependent young to a minimum (one child at a time) and thus reduces the load of baby and food that they have to carry on their foraging trips. Jones (1986) has demonstrated that child mortality is directly related to the length of the birth interval among !Kung women. His research has shown that short birth intervals consistently leave fewer dependents than longer intervals.

Continuous lactation has one cost; it puts high energetic demands on nursing mothers and thus constrains the contribution that they can make to the group's subsistence. Hurtado and Hill (1990) have shown that slight seasonal increases in gathering activities among Hiwi women in Southwest Venezuela cause significant seasonal weight loss and may lower their fertility. Additionally, the demands on women as child-care providers seems to limit their food getting activities to those tasks that are compatible with nursing and caring for children,

Table 12. Data from the Standard Cross Cultural Sample on the Weaning of Children among Mobile Hunter-Gatherers (Barry and Schlegel 1980).

Group	When Weaned[1]	Age of Weaning[2]	New Foods Introduced[3]
!Kung	1	36-72	.
Hadza	3	12	1
Mbuti	2	12-36	2
Andamanese	1	36-48	.
Tiwi	1	36-48	3
Aranda	1	36	.
Gilyak	1	24	.
Yukaghir	1	48	.
Copper	1	36-60	4
Montagnais	2	12-60	.
Kaska	1	24-36	4
Kutenai	1	24+	.
Botocudo	.	.	.
Aweikoma	.	.	.
Yahgan	1	24	.

1. Codes for when weaned: 1. Weaned late (after 2 years)
   2. Weaning is intermediate (after 1 year)
   3. Weaning is early (after 6 months)
2. In months
3. Codes for when new foods introduced: 1. < 1 month
   2. 1-6 months
   3. 7-12 months
   4. > 12 months

Reference: Barry and Paxson 1980

Table 13. Data from the Standard Cross Cultural Sample on Women's Contributions to Subsistence among Mobile Hunter-Gatherers (Barry and Schlegel 1980).

	Percent Female Contribution			
Group	Fishing	Hunting	Gathering	Ave. Female Contribution
!Kung	-	0	25	19
Hadza	-	0	67	50
Mbuti	75	33	50	44
Andamanese	42	0	50	32
Tiwi	30	20	70	46
Aranda	0	0	58	26
Gilyak	19	0	75	27
Yukaghir	0	0	-	0
Copper	13	15	75	16
Montagnais	75	10	100	32
Kaska	25	17	75	24
Kutenai	0	0	100	26
Botocudo	0	0	88	4
Aweikoma	-	5	50	17
Yahgan	67	15	81	65

Reference: Barry and Schlegel 1982

namely, tasks that are: "low in risk; performed close to home; easily interrupted; and that don't require rapt concentration" (Lancaster 1989: 99). Lancaster (1989) hypothesizes that these constraints have led to men concentrating on unpredictable and risky activities like hunting, while women concentrate on low risk food-getting activities like the gathering of floral resources (see also Hurtado and Hill 1990).

The constraints placed on women's mobility by their dual roles as plant food collectors and child care providers implies that women play a significant role in the decision-making process as to where settlements are located and when they are moved. The ideal settlement locality from the perspective of nursing women foragers would seemingly have diverse and abundant plant resources within a short distance of the camp. Short commuting distances reduce the caloric expenditures of women's gathering trips and thus probably increase the chances that their young will survive.

Hunter-gatherer occupations along swamp margins are seen as a response to women's dual roles as major contributors to the group's dietary needs as well as their responsibility for the daily care and nursing of children. It is not unreasonable to assume that women may have taken a more active role in settlement decisions especially if the group contained a proportionally large number of nursing mothers and pregnant women. In this situation, it would have been in the group's best interest to locate their settlements in optimal environments where women could effectively and efficiently perform both food gathering and child care tasks. A brief review of the botanical literature for the southeastern United States (Table 11) suggests that swamp margin locations represent such environments.

Archeologically, sites located near swamp margins for the purpose of minimizing women's energy expenditures when on collecting forays may be expected to differ from similarly located sites occupied for different reasons. At a more intuitive level, occupations established for the benefit of maximizing women's role in the group would contain evidence of both male and female activities. Sites such as these would be occupied for extended periods of time, and exhibit the organizational and structural characteristics of residential base camps (as discussed earlier). In addition to these sites being physically larger and more structurally complex, they would be located near the swamp edge and might contain disproportionate quantities of edible and medicinal plant remains. Conversely, sites occupied by special task groups (locations, field camps, stations, or caches) would be comparatively smaller, contain a lesser quantity and/or diversity of artifacts, and exhibit less complex intrasite structural patterning.

Besides variations in the organizational and structural characteristics of sites, variability is expected in the choice of settlement locations. While base camps would be located in microenvironmental settings near the swamp margin, field camps, locations, and stations are expected to occur at greater distances from the swamp, particularly if these occupations reflect hunting activities. Hunters presumably would position themselves outside (but within easy striking

distance) of areas where terrestrial animals are known to congregate. Once prey species entered the area, they could be easily captured and removed, thus providing a less disruptive influence for the capture of additional game.

In regions characterized by residentially mobile groups, the use of swamp margins as base camp locations is expected to decrease when domesticated plants (also used as weaning foods) become an important component of the diet and when highly productive agricultural lands are located at a distance from swamp environments. Under these conditions, agriculturalists can be expected to tether their site locations close to agricultural plots where planting, tending the fields, and harvesting activities will occur during the summer months. Ethnographic research has shown that horticultural-agricultural pursuits require as much or more labor input as foraging activities and that women make significant contributions to agricultural production while maintaining their role of principal child care provider (Boserup 1965, Clark and Haswell 1966, Carneiro 1968, Cohen 1977). Women horticulturalists tend to bear more children over their lifespan than hunter-gatherer women, since they have children every other year (Lancaster 1989). This is in contrast to the common hunter-gatherer birth interval of four years. This shortened birth interval is possible because horticulturalists tend to be more sedentary than hunter-gatherers, have agricultural crops to use as early weaning foods, and use juveniles as "parental surrogates" to assist in caring for "weaned 2- to 5-year olds." Larger families are desirable in horticultural economies because quite small children are valuable labor sources for activities such as "weeding, defending field crops from pests, and the preparation of foods for cooking" (Lancaster 1989:190). A sedentary lifestyle, coupled with the use of sibcare systems and early weaning foods, allows horticulturalists to have larger families without added burden.

As women's mobility options become more restricted due to their changed food producing activities, and as domesticated foods supplement or replace wild plants in the diet, the need for locating base camps along swamp margins diminishes. At the same time, group mobility strategies will become more logistically orientated with base camp locations centered around agricultural fields.

Previous investigations focusing on settlement patterns and occupation chronology at Redstone Arsenal have shown that large villages, mound centers, and base camps occur on the agriculturally rich floodplains and terraces in the Tennessee Valley. The sites in this environment were large, contained evidence of long occupation spans, and were predominantly occupied during the Woodland and Mississippian Periods (Thomas et al. 1980). Conversely, at a greater distance from the Tennessee River, site characteristics varied in their sizes and length of occupations, but clustered around swamps. These sites, unlike those found in the Tennessee Valley, were predominantly occupied by Archaic Period groups. Existing settlement pattern data thus suggest that a major shift in settlement locations occurred about the time that domesticated foods began to play an increasingly important role in the group's subsistence base. It is also about this same time that the use of swamps decreased in importance as optimum settlement locations. This diachronic shift in preferred settlement locations is

believed to be the result of changing mobility strategies, modes of production, and labor investments.

The discussion presented above has shown that hunter-gatherer mobility and settlement strategies may vary along several ecological and social dimensions. As such, investigations conducted at Redstone Arsenal may provide important new information for addressing not only which cultural components are present on swamp edge sites but the organizational and structural characteristics of these sites as well.

The present research focused on the prehistoric use of swamps and swamp margins since all except two of the 20 sites examined by the survey were clustered around the McDonald Creek drainage. The importance of swamps as a locational setting for prehistoric settlements is well documented by the Neal Road Extension Corridor survey, which serves as a transect bisecting the central and eastern regions of Redstone Arsenal. In the central region of the facility, west of Patton Road, the terrain is generally higher and less dissected. Swamps are rare and the density of archeological sites is extremely low, considering that only one prehistoric site (the second site was a historic cemetery) was discovered in this area. Conversely, in the eastern region of the facility the terrain is lower, resulting in the formation of extensive swamps. It is along these swamps that archeological site density increases and that the majority of sites examined during the present project were encountered.

At the present time very little information exists concerning the tethering of cultural systems around swamp margins. While at an intuitive level it is easy to hypothesize the economic importance of environmental ecotones, little or no data exists concerning the types of resources that were exploited or the types of activities that were conducted on sites located within this particular environmental setting. Furthermore, little data exists on the cultural periods or length of occupations represented at the sites. In light of the present understanding of these sites, the review presented above is helpful in generating a number of questions which are beneficial in assessing each site's potential to contribute important new information. Some of these questions include:

1) Do these sites reflect use as basecamps, locations, or fieldcamps?

2) Do these sites exhibit long-term continuous use or reoccupation by the same or different groups over time?

3) What cultural-historical groups occupied these sites?

4) Were these sites occupied during the same or different seasons of the year?

5) Did the people who occupied these sites construct storage facilities or other structures?

6) What resources were procured from these locations?

7) Do these sites exhibit internal spatial patterning reflective of special activity areas?

As noted, post-depositional disturbances (ie. logging, plowing, landscaping, etc.) may have mixed or transported materials in such a manner as to eliminate the possibility of answering all of the questions posed above. However, not all of the questions require a high degree of depositional integrity. For instance, studies focusing on occupational histories, the intensity of occupations, and the reoccupation of landforms can be successfully undertaken on sites exhibiting high surface content visibility (see Chapter III) and disturbance. Therefore, in regions where these archeological characteristics are not well documented, disturbed sites may still contain important information.

Evaluation of the 20 sites investigated during the present survey was structured according to each sites' potential to address one or more of the questions stated above. Table 14 summarizes the site characteristics and management data for each of the cultural resources investigated during the present project. The second and third columns provide information on site dimensions and orientations. The fourth column indicates the total site area in acres. The fifth column represents the minimum and maximum site elevations. Identification of the nearest water source and its distance to the site is provided in columns six and seven. In column eight, the type of cultural components present at each site is provided. The resource evaluations are presented in column nine, with the designation "PE" indicating that a resource is potentially eligible for inclusion on the National Register of Historic Places and "NE" indicating that a resource is not considered eligible. Column 10 provides recommendations for the sites.

RECOMMENDATIONS

This section will discuss recommendations for the three potentially eligible Neal Road Extension Corridor sites and site 1Ma126 located at the Dry Boat Storage Facility.

Neal Road Extension Corridor Sites Recommendations

As outlined above, the sites recorded within the Neal Road Extension Corridor offer a provocative glimpse at Archaic settlement modeling and social structure. The facility of these sites to contribute to such modeling beyond the information already gathered through their recordation is dependent on two factors: preservation and the presence of culturally diagnostic materials. These two criteria guided the determinations of eligibility expressed above, and those sites apparently lacking both subsurface preservation and diagnostic materials were considered as ineligible to the National Register. In addition to those sites

Table 14. Summary of Neal Road Site Characteristics, Evaluations, and Recommendations.

Sites	Site Dimensions* N/S	E/W	Site** Area	Elevations	Nearest Water	Dist. to Water^	Cultural Components^^	Site Eval	Site Recom
1Ma22	2700	1100	34.0	570/585	McDonald Cr. swamp	50	A,W(?)	PE	Test
1Ma111	275	50	0.3	590	McDonald Cr. swamp	250	Unk. P	NE	
1Ma112	650	200	3.0	595/585	McDonald Cr. swamp	200	Unk. P & H	PE	Test
1Ma113	150	300	1.0	580/590	Unnamed Tributary	200	Unk. P	NE	
1Ma114	450	550	5.7	595/600	McDonald Cr. swamp	400	Unk. P & H	NE	Tested
1Ma115	1425	450	13.0	585/575	McDonald Cr. swamp	150	Unk. P	NE	
1Ma116	800	250	4.6	570/575	McDonald Cr. swamp	20	Unk. P	NE	
1Ma117	500	250	2.4	580/585	McDonald Cr. swamp	100	Unk. P	NE	
1Ma447	250	500	2.3	630/640	Natural Spring	25	Unk. P & H	NE	
1Ma448	55	200	0.3	630	NA	NA	H		
1Ma449	600	200	2.8	570	McDonald Cr. swamp	50	Unk. P	NE	
1Ma450	250	250	1.3	570	McDonald Cr. swamp	50	Unk. P	NE	
1Ma451	400	200	1.6	570	McDonald Cr. swamp	50	Unk. P	NE	
1Ma452	500	300	3.4	570	McDonald Cr. swamp	20	Unk. P	NE	
1Ma453	650	500	6.4	570	McDonald Creek	150	Unk. P	NE	
1Ma454	650	400	4.1	570/575	McDonald Creek	200	Unk. P	NE	
1Ma455	150	300	0.8	570	McDonald Creek	300	H	NE	
1Ma456	450	300	2.3	575/580	McDonald Creek	450	Unk. P	NE	
1Ma457	1350	200	5.5	570/580	McDonald Creek	40	Unk. P & H	NE	
1Ma458	650	200	3.0	570	McDonald Cr. swamp	50	Unk. P	NE	

* Dimensions in feet
**Area in acres
^ Distance to water in feet
^^Componts: A-Archaic; W-Woodland; Unk. P-Unknown Prehistoric; H-Historic

determined as ineligible on the basis of this survey, another site, 1Ma114, has been tested by the US Army Corps of Engineers, Mobile District, since the completion of the survey, and has been determined to be ineligible to the National Register on the basis of that testing. Therefore, only two sites are recommended as potentially eligible to the National Register at this time: 1Ma22 and 1Ma112.

Evaluative testing of these two sites, if they are to be impacted by future construction, should be of sufficient intensity to determine the following site characteristics:

1) Site integrity: Site integrity is defined as preserved middens, intact soil deposits containing artifacts, cultural features, or other deposits exhibiting spatially meaningful artifact patterning.

2) Cultural components present: An analysis, based on artifact collections and dating techniques, which specifies which components are present and the integrity of each.

3) Depth and horizontal distribution of archeological deposits: the spatial distribution of each component present.

4) Presence of subsurface features or midden beyond that recovered in the test excavations sufficient in quantity to warrant further data recovery excavations.

5) Presence and preservation of floral and faunal materials.

The recommended field work procedures for conducting Phase II investigations on these two potentially eligible sites includes shovel testing, excavation units, plowing, and mechanical stripping. The particular mix of procedures recommended at each of the two sites is presented in Table 15. Basically, shovel testing and the excavation of larger formal units are recommended on sites that are located in wooded areas, while plowing and mechanical stripping are recommended on sites located in cleared pasture fields. Sites whose boundaries include both wooded and cleared lands should implement a testing program using all four procedures depending on the area of the site being investigated. Additionally, the historic component at 1Ma112 should be considered via archival research in addition to the archeological studies. A site by site description of the recommended field procedures is provided below.

Site 1Ma22

This site represents a large multicomponent 34 acre artifact scatter situated on the north side of the McDonald Creek swamp. Shovel testing during the Phase I survey revealed relatively high concentrations of artifacts along the ridge crest and in the northwest corner of the site. Also, a possible feature was discovered in one of the shovel tests along the site's eastern boundary. The south

end of this site is wooded. It is recommended that the site area lying in pasture be plowed and control surface collected for the purpose of better understanding the cultural components present as well as the structural and settlement variability occurring over this rather large area. The information gained through this operation should then be used to determine the locations of future mechanically stripped blocks and/or hand excavation units. The use of heavy equipment should be restricted to those areas along the ridge crest and the eastern half of the site where the shovel testing revealed shallow plow zone deposits overlying subsoil. In the northwest region, where deeper deposits occurred, it is recommended that three 2 by 2 meter excavation units be dispersed across the area to further examine the soil stratigraphy and vertical extent of cultural materials. The recommended approach for the southern wooded area of the site involves the systematic placement of shovel test units along grid transects spaced at 10 meter intervals. The information gained through this operation should then be used to determine the locations of three 2 by 2 meter hand excavation units.

Table 15. Recommended Procedures for Phase II Testing of Two Sites

Site	Present Land Use*	Shovel Test	Excavation Units	Plowing	Mechanical Stripping	Burial Removal
1Ma22	C/W	X	X	X	X	
1Ma112	W	X	X			

Land Use: C-Cleared Pasture Land; W-Wooded

Site 1Ma112

This site represents a multicomponent artifact scatter situated along a wooded ridge crest overlooking the west bank of McDonald Creek swamp. The northern-most region of this site also contains the archeological remains of historic structures. The recommended approach for Phase II testing includes additional surface collection of the power line right-of-way, close-interval (10 meters or less) shovel testing of the wooded areas, and hand excavation of three 2 by 2 meter units in areas designated by the shovel test procedure as containing unusually high artifact concentrations, middens, and/or features. In addition to the work on the prehistoric component, three 2 by 2 meter units are recommended on the historic component to better determine the occupation date and the material remains of nineteenth-century groups living in north-central Alabama. The investigation focusing on the historic component should also include cartographic and land records research.

Site 1Ma126 Recommendations

Management recommendations that are available to mitigate the adverse impacts on Site 1Ma126 include avoidance, preservation, and data recovery. Avoidance would entail the placement of the Dry Boat Storage Facility to an alternate location. In this regard, the area south of the road leading to the recreation area may be a possible alternative site location. Shovel testing indicated that the area south of the recreation road and east of the filtration plant road was severely disturbed and yielded few artifacts. If this area is considered a viable alternative to the original site location and the area west of the filtration plant road is included within the construction zone, then additional archeological reconnaissance and/or testing would be necessary in the area west of the filtration plant road.

The second mitigative procedure is preservation, which would in effect protect the cultural manifestations occurring in the impact zone from future deterioration or destruction. This could be achieved by covering the site with fill before the asphalt surface of the boat storage facility is completed. By placing fill over the site and preparing this artificial surface for asphalting, disturbances to the underlying cultural deposits should be nullified. If this option is implemented, then an archeologist should be present at the construction site to insure that no damage occurs to the natural ground surface.

The third and probably most costly mitigative procedure is data recovery. This procedure should be implemented only if the two procedures described above are eliminated from consideration. Under the data recovery option, problem-oriented research including intensive excavation, analysis, and report preparation would be necessary. Given the extent of the site, the spatial data gathered by both the University of Alabama and the current testing program should be analysed to determine the locations and concentrations of activity foci within the site's boundaries. Additional shovel tests may be necessary to augment the existing spatial information. A large number of excavation units should then be distributed across the site area, placed in accordance with both judgmental and random sampling procedures, to gather data concerning cultural middens, strata, and material culture. Large scale block stripping should then follow. Given the presence of human remains noted by the University of Alabama study, it would probably be necessary to strip the entirety of any area scheduled for impact in order to assure that no human burials were present or were not removed. All research-significant features thus exposed should be sampled. The number of additional shovel tests, excavation units, and the area to be stripped would be dependent upon the size of the area proposed for impact, but it is recommended that the unit excavations study at least 5 percent of the site area, and, as stated above, that block stripping cover the entire area of any proposed impact zone.

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